POST-IPO GENUITY Independence and $2 billion have Genuity's Gudonis making big plans. **Page 25.**

INSIDE OFFICE 10 The Microsoft Office 10 productivity suite hits beta with an emphasis on collaboration. **Page 10.**

The leader in network knowledge

NetworkWorld

September 4, 2000 Volume 17, Number 36

The network portal: www.nwfusion.com

An inside look at

AT&T's CABLE GAMBIT

BY TIM GREENE AND DENISE PAPPALARDO

Everyone knows about AT&T's grand cable TV plans, but few realize just how ambitious those plans are. Try this: The infrastructure AT&T is building will ultimately support 64M bit/sec downstream links to the home.

AT&T's **FAT-PIPE** PLAN

The company won't get there overnight, but the idea is to rewire America with broadband in preparation for the day when communications means truly integrated voice, streaming video and a boatload of data. It is a dramatic about-face for a company that was casting about in the early 1990s looking for its role in a digital future.

"We realized we were a kilobit company in a megabit age," says Norm Schryer, division manager of broadband services research at AT&T's research arm, AT&T Labs in Florham Park, N.J. This 1997 awakening led to a $110 billion cable TV buying spree, giving the company access to a potential of 27 million residential customer homes.

See **AT&T**, page 78

Pink slips set to fly at beleaguered Novell

BY DENI CONNOR

PROVO, UTAH — Novell is expected to pink-slip up to one-quarter of its workforce as early as this week in response to the network giant's worsening financial situation.

The move is likely to exacerbate a yearlong internal debate over a radical recovery plan that would spin off Novell's hotter technologies into a separate company unencumbered by Novell's withering NetWare legacy.

Sources say Novell will lay off up to 1,300 of its 5,500 employees to bring expenses in line with diminishing revenue and take an estimated charge of $20 million in severance and benefits. The layoffs come on the heels of a string of upper-management defections and amid speculation that additional executives are close to leaving.

Novell's last major layoff affected 17% of its workforce in the third quarter of 1997 as

See **Novell**, page 80

www.nwfusion.com

MORE ON NOVELL

Discuss the company in our Novell forum.

Get the latest Novell financial information.

DocFinder 9742
find it online

User-friendly alternative to URLs due soon

BY CAROLYN DUFFY MARSAN

The Internet engineering community is putting the final touches on a technology that could replace URLs by allowing end users to access Web sites, search for information and send e-mail using easy-to-remember names instead of complicated strings of characters, dashes and dots.

The Common Names Resolution Protocol (CNRP) was developed by engineers from Network Solutions, Real-

See **Common**, page 16

FEATURE

RE-ROUTING THE ROUTER

Layer 3
switches have
elbowed those trusty routers
out of the core of the network.
But routers have found a new home on the
network edge as WAN access devices. **Page 44.**

Plus, a handy listing of a dozen indispensable Cisco router commands. **Page 48.**

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Actual speeds depend on many factors, including the plan you sign up for with your ADSL provider, and are often less than the maximum. [2]mhz only measures microprocessor internal clock speed; many factors affect application performance. [3]gb equals
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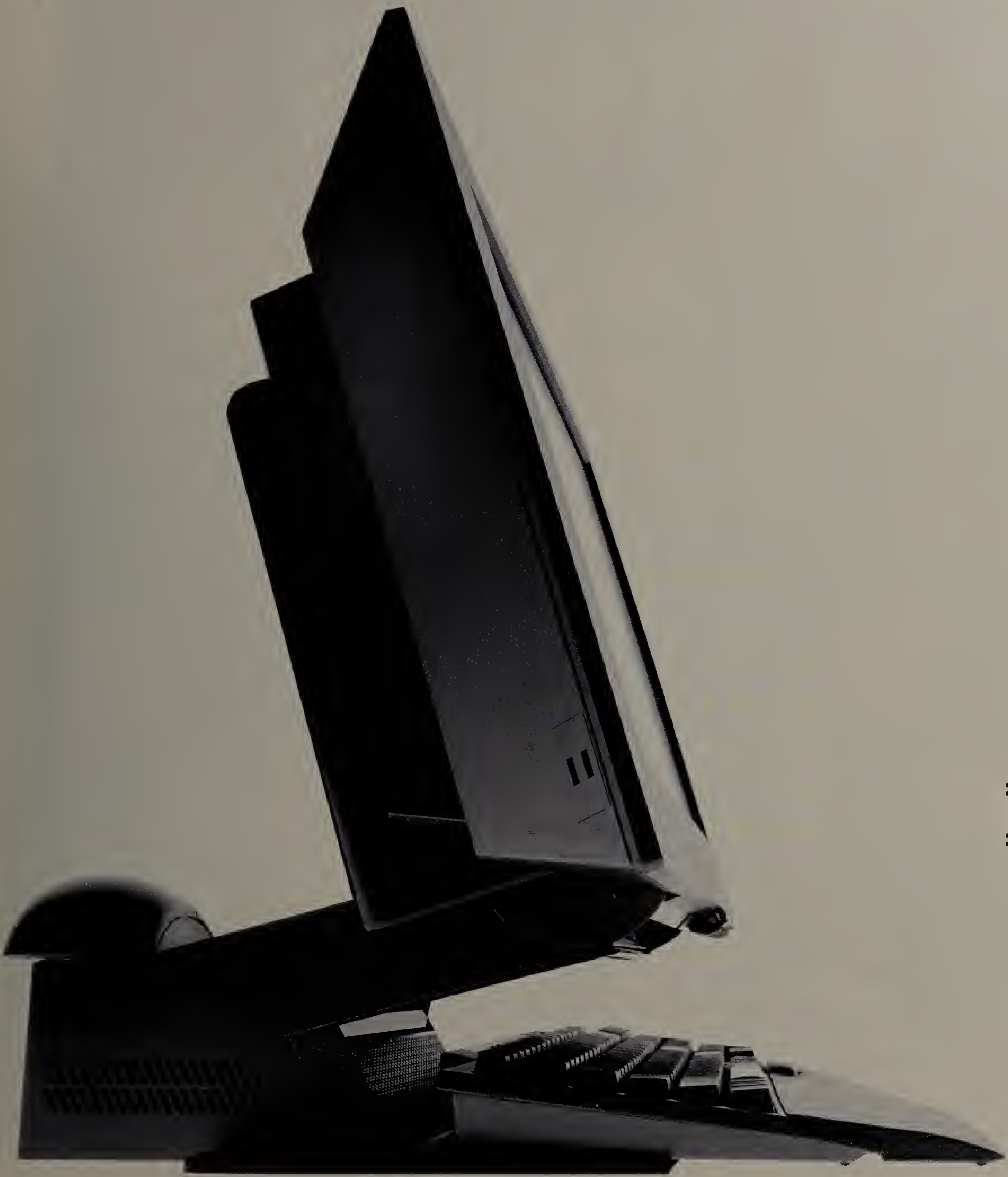

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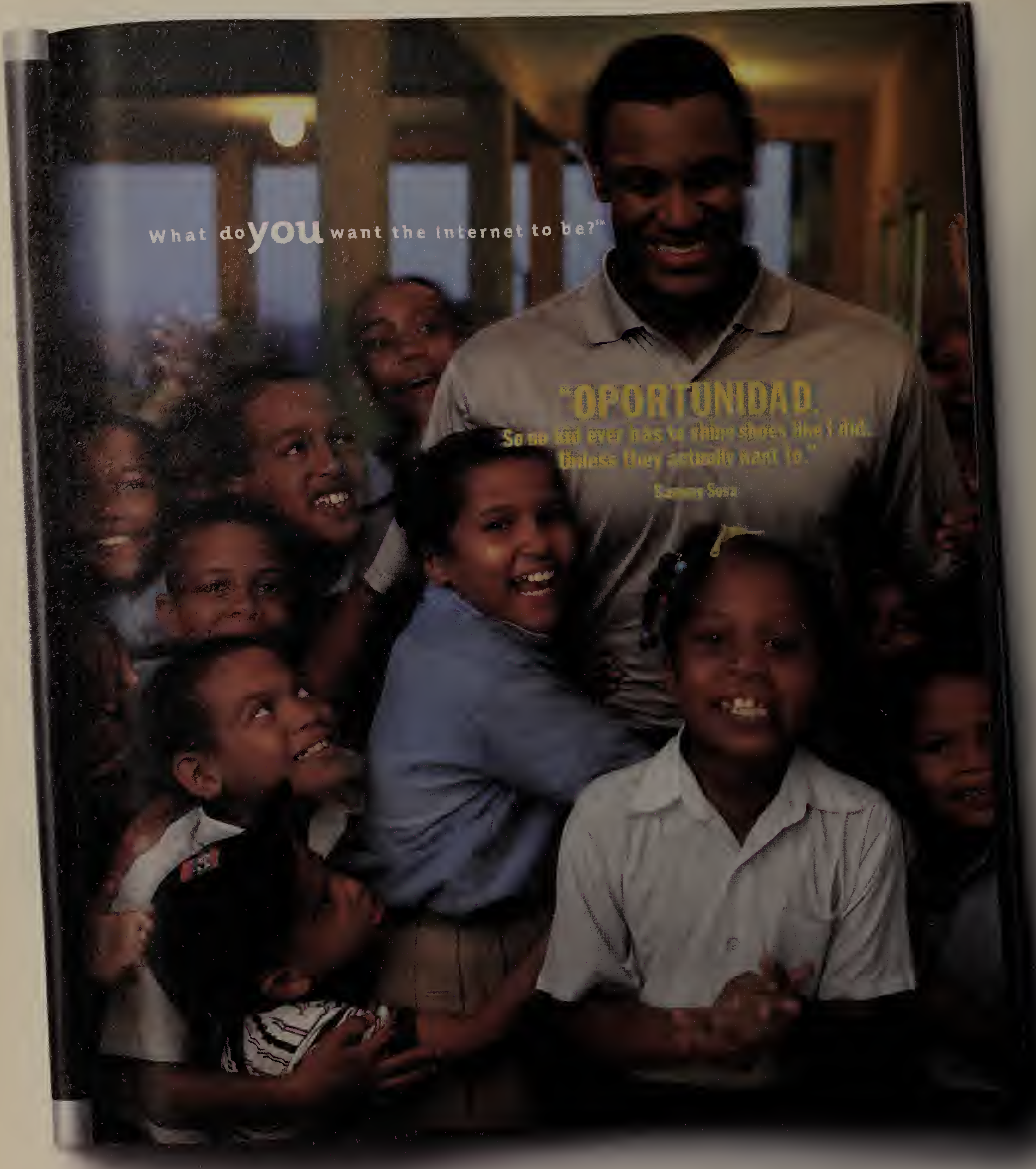
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Review

You need to find out about network problems before your end users do. *So we tested nine products that provide network monitoring and alerting on Windows NT networks. IpMonitor 6.0 from MediaHouse Software wins our World Class Award, while AppManager 3.4 from NetIQ and RoboMon NT 7.5 from Heroix made strong showings.* ***Page 53.***

John Windhausen

Gerry Lederer

Face-off

Should building owners be required to allow all carriers access to their sites? ***Page 50.***

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THIS WEEK ONLINE

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INTERACTIVE

Help Desk Forum

A user seeks an answer to the question: Which is better for a SOHO LAN, a hardware or a software firewall? **DocFinder: 9733**

Test Pilots

Lucent WaveLAN Wireless LAN

Xanatos says it offers good performance, but it's really only designed for small groups. **DocFinder: 9740**

Webcast

Active Directory vs. Novell Directory Services

We've got tech execs from Microsoft and Novell to answer your questions about the two products. Register now for the live Webcast on Sept. 8 at 1 p.m., EST. **DocFinder: 9535**

SEMINARS & EVENTS

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Get expert tips on maintaining service levels, leveraging Internet Traffic Management, and measuring application-level performance and user satisfaction. Sign-up for our High-Performance Web seminar. **DocFinder 8851**

FORUMS

Remote challenges

How do you manage your IT staffers who work in remote locations? Or if you are one of those staffers, what could your boss do to best support you? **DocFinder: 9734**

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BARNEY'S RUBBLE

The best of the NetFlash daily newsletter

Sun admits to memory problem

If Microsoft had a technical problem, and customers were asked to sign nondisclosures so they couldn't discuss it, Scott McNealy would have a field day.

Instead, it was Sun that tried to cover up the failings of its Ultra Enterprise Unix servers. These high-end boxes have been crashing for no particular reason — at least Sun hasn't been able to pinpoint the cause (McNealy can't blame Windows for these crashes.) The company says it will no longer request the nondisclosure agreements. **DocFinder: 9745**

Get even by e-mail

Sun customers might want to take advantage of a wacky new Web site — Insultpro.com. With this site you can e-mail (or snail-mail) insults anonymously. It'll cost you $6 to tell Scott McNealy that his servers break down more than your 10-year-old Yugo. **DocFinder: 9746**

New tool tracks employee Internet, e-mail usage

Wondering whether your employees are working or just sharing personal e-mail with friends around the world? I know I am — wondering that is. Well Trisys has a new tool that makes spying a snap. Insight not only tracks where you go on the 'Net and how long you spent at pamelaanderson.com, but it also tracks the use of ordinary office applications. Were you really working on that spreadsheet, or playing solitaire again?

Hope my boss never finds out about this piece of software. Michael Cooney could be filling in for me full time. **DocFinder: 9749**

— Doug Barney, executive editor, news

Sign up for this e-mail newsletter online. DocFinder: 3850

COLUMNISTS

Water Cooler

An Olympic waste

Sure, you'll be able to watch exhaustive video from the summer games — but only if your ISP has bought some proprietary products to do the streaming. Fusion Staff Writer Jason Meserve is not pleased. **DocFinder: 9738**

View from The Edge

A peek inside BroadBand Office's wiring closet

Edge Managing Editor David Rohde takes a look at an emerging class of local exchange carriers — owners of large buildings. **DocFinder: 9737**

Keeping Current

Ignore the tera-hype

Vendors will soon start hyping 100-terabit routers for the Internet. Fred McClimans tells you why you should ignore them. **DocFinder: 9736**

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NEWS BRIEFS, SEPTEMBER 4, 2000

A win for spread-spectrum wireless transmitters

The makers of spread-spectrum wireless transmitters that link PCs, entertainment devices, domestic appliances and telephones onto a broadband home or office network last week scored a regulatory victory that they say will improve bandwidth fivefold. The Federal Communications Commission changed its spectrum rules to let such "frequency-hopping" devices employ a minimum of 15 nonoverlapping frequencies, each 5-MHz wide, in the unlicensed 2.4-GHz band. The old rules limited these transmitters, which jump frequencies to minimize interference with other unlicensed wireless applications, to collections of 1-MHz slices. The run-up to the decision pitted an alliance of vendors promoting home networking, notably Intel, Motorola, Proxim and Siemens, against another group principally pushing the new 802.11 wireless Ethernet standard, notably Cisco, Lucent and 3Com. The latter group claimed wider bands for frequency-hopping devices would interfere with wireless Ethernet networks in schools and offices, but the FCC concluded the opponents "greatly overstated" the interference risk.

NTT seals Verio deal

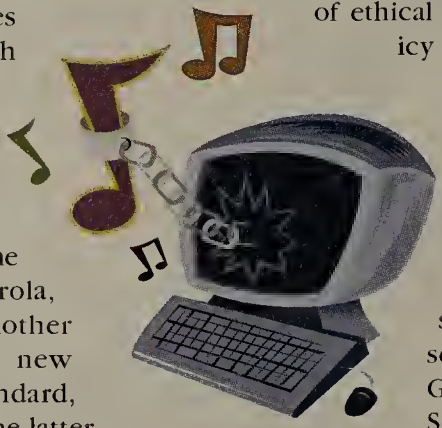
After a nearly four-month tender offer and a U.S. government investigation, NTT Communications of Japan last week completed its acquisition of Englewood, Calif., backbone provider and Web hosting firm Verio. NTT is a telephony and Internet provider. At the close of the tender offer, NTT owned approximately 95% of Verio's shares, for which it paid about $5.5 billion. The two companies, which have had a working relationship since 1998, will be able to offer a variety of IP, Web hosting and e-commerce services to customers in the U.S. and Asia, officials say. The deal is set to close later this month, at which point Verio will become a subsidiary of NTT.

Cisco drops PixStream into cart

Cisco will buy privately held PixStream, a producer of digital video distribution and management software and hardware, in a $369 million stock transaction, Cisco announced last week. The deal will bring Cisco's acquisition total to 17 for this year. PixStream products include the VDS5000 professional video network system, the VDS2000 video network system and the VDSmanager suite of video network management software. PixStream will let Cisco move toward providing digital video over the Web, the company says.

One-third of campuses ban Napster

Thirty-four percent of U.S. colleges have banned the music file-trading program Napster for Internet users surfing over campus servers, according to a report from the Gartner Group in Stamford, Conn. College students who use Napster have caused headaches for network administrators, prompting some to ban the program. Gartner polled administrators from 50 colleges and found the Napster issue raising serious moral and legal questions. "Schools must consider the implementation of ethical standards and policy guidelines, even written agreements, that explicitly state that copyright infringement is illegal and will not be tolerated," says P.J. McNealy, senior analyst for Gartner's e-Business Services. Napster CEO Hank Barry issued a brief comment on the study. "We are pleased that two-thirds of the schools polled in the survey will allow their students to participate in the Napster community," he said.



'Net sales tax passes Calif. Senate

California companies will be required to apply sales tax to online purchases if legislation passed last week by the state Senate is approved by the state Assembly and signed into law by the governor. California would be the first state to pass such legislation, which would apply to companies that are based in the state and have an online presence but do not charge sales taxes on products sold over the Internet. "This bill would clarify that the processing of orders electronically, by fax, telephone, the Internet or other electronic-ordering process, does not relieve a retailer of responsibility for the collection of the tax from the purchaser if the retailer is engaged in business in this state," the bill states. California Gov. Gray Davis has not been a supporter of Internet taxes.

Judge fines Microsoft $1 million

A federal judge last week ordered Microsoft to pay $1 million in punitive damages to Bristol Technology for violating Connecticut's Unfair Trade Practices Act. Bristol alleged that Microsoft injured Bristol and the rest of the software industry through predatory manipulation of the access to Windows programming interfaces, according to the suit filed in August 1998 in U.S. District Court in Bridgeport, Conn. A jury in July 1999 found that Microsoft had violated the unfair trade practice's provision.

Test lab aims to give open source a boost

Hardware vendors, Linux companies join forces.

BY PHIL HOCHMUTH

Popular open source software such as Linux and Apache Web server could get a major boost thanks to a new vendor-neutral testing lab announced last week.

Several major hardware vendors and Linux companies are building the nonprofit Open Source Development Lab (OSDL), due to open in Portland, Ore., by year-end.

The lab will help developers put programs through the paces on Big Iron-level servers and storage devices. Lab developments could lead to Linux versions that scale to 100 processors, or an optimized version of the Apache Web server for mainframes, advocates say.

IBM, Intel and Hewlett-Packard are among several hardware firms providing funding and equipment for the lab.

While Linux is very stable on servers with up to eight processors, it does not have symmetric multiprocessing (SMP) support to scale to the 32-, 64- or 128-processor range, says David Sifry, chief technology officer for Linuxcare, a Linux support firm and OSDL member. This high-level SMP support is required by many large companies.

"One of the reasons Linux is so hugely effective and reliable on [smaller] boxes is that's all the developers had when Linux was being created," Sifry says. Giving Linux developers large servers, storage arrays and mainframes to give their code a workout will help give Linux and other open source programs enterprise strength in the future, he adds.

"If you've got some [IBM] S/390s now available for testing, turning up the I/O performance in Apache becomes possible," Sifry says. "Apache wasn't built around having this monstrous pipe to pour data through, so there could be some optimizations there."

Apache is the most popular Web server on the Internet, running on 63% of Web servers, according to Web research firm Netcraft. On top of that, the firm reports 36% of Web servers run Linux as their server operating system.

"Anything that could help [open source software] run better on different types of hardware is a good idea," says Maurice Smiley, a systems administrator at Gulf Interstate Engineering, a Houston firm that designs equipment for the gas and oil industries.

Smiley uses Linux on several file and print servers in his network, as well as Samba, an open source program that lets Linux- and Windows-based servers communicate.

The lab will be run by an independent board of directors consisting of engineers from sponsoring companies and open source community members. Use of the lab will be based on an application process, where the board will review open source project proposals from companies and independent developers. ◪

Giving strength to open source

Several hardware makers and Linux companies have teamed to create the first open source software testing lab. Members include:

Hardware companies:

- IBM
- Hewlett-Packard
- Intel
- NEC
- Dell
- SGI

Linux companies:

- Caldera
- Linuxcare
- Red Hat
- SuSE
- TurboLinux
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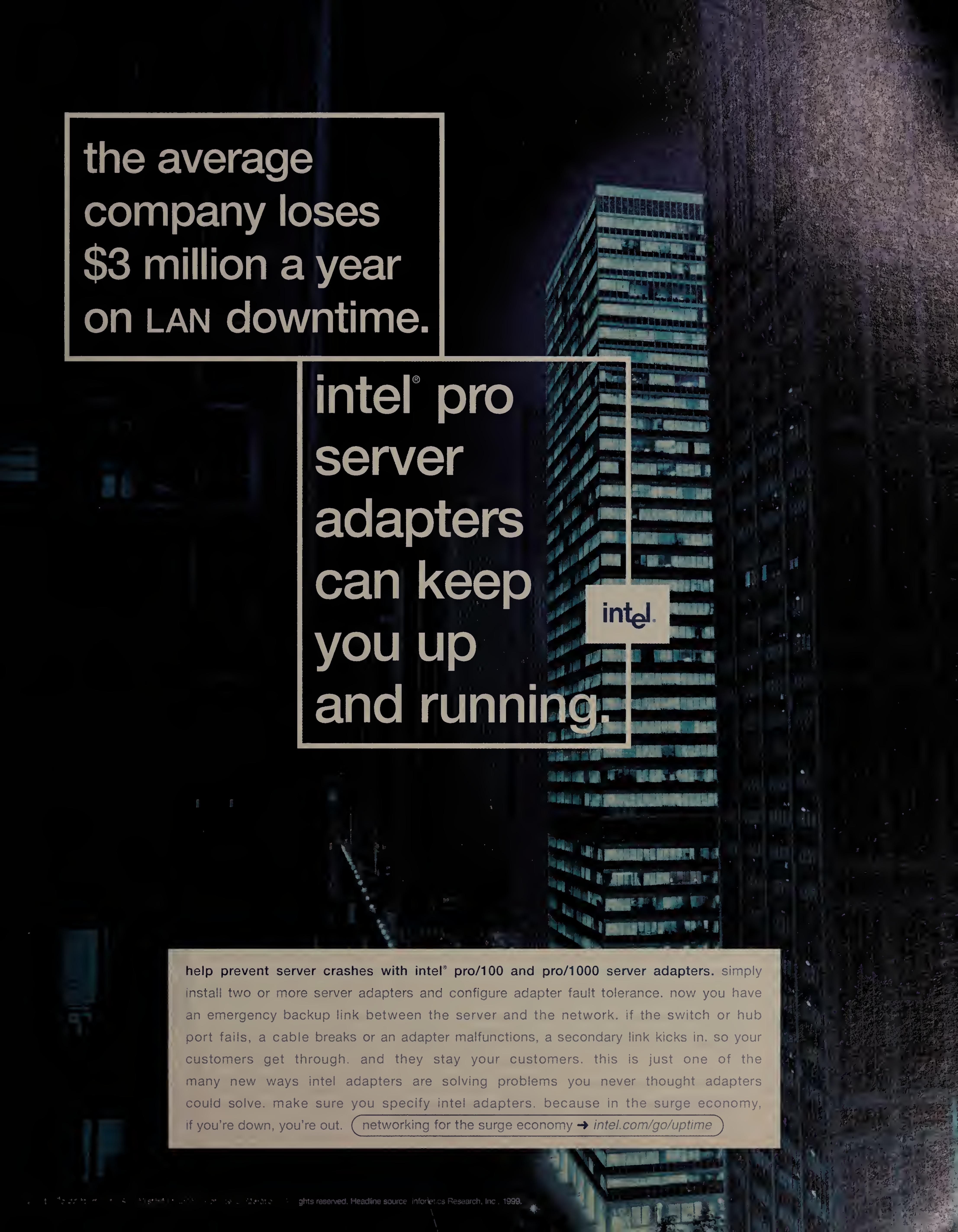

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Microsoft Office takes new collaboration roles

The upcoming version of Microsoft's productivity suite is closely tied to messaging and document management servers.

BY JOHN FONTANA

Microsoft last week unveiled the beta-test version of Office 10, which it hopes to turn into a cornerstone of a collaboration environment that combines the popular suite of productivity applications and Exchange Server 2000.

The software includes a host of usability features, but the important additions for IT executives focus on collaboration and Internet integration.

Microsoft is trying to combine Office, Exchange 2000 and a document management server announced last month called Tahoe into a platform for collaboration and so-called knowledge management.

Office 10, which is likely to be called Office 2001 when it ships next year, includes team collaboration applications and tools, native support for XML for integrating Office documents with Web-based information and automatic data recovery tools.

The suite also has new administrative features, including new installation wizards, and security and maintenance tools.

With Office 10, Microsoft is adding a workgroup application tentatively called Team Workspaces that requires the Exchange 2000 Web Storage System as its data repository. Team Workspaces lets groups of users share documents, calendars, contacts and task lists in an online workgroup. The application creates a deeper link between Office and Exchange, which Microsoft has been touting as its one-two collaboration punch.

"With Office 10, Microsoft is telling IT that collaboration is going to happen and IT needs to set it up," says Chris LeTocq, an analyst with Dataquest. "When IT looks at Office 10, they will find that implementing it almost requires setting up collaboration."

Microsoft is trying to counter rival Lotus, which later this year is set to release its Raven knowledge management server, its Office-Domino integration software code-named Bluejay and QuickPlace 2.0, which is similar to Workspaces.

Microsoft is also adding to Office 10 a tool for building workflow applications that is similar to a Lotus tool called Notes Designer.

"We are making Office a core part of collaboration with Exchange," says Tom Bailey, product manager for Office.

The question is how fast will enterprise customers adopt the idea.

"We're evaluating Office but our more immediate goal is deploying Windows 2000 and Exchange 2000," says Don Snively, network architect for the State of New York Human Services Application Service Center in Albany. Running Exchange 2000 requires the Active Directory in Win 2000, and rolling out either server is no trivial task.

Also for businesses, Microsoft is more closely integrating Office 10 with the Web by adding native XML support in Excel and Access so those applications can integrate with Web-based data.

Office 10 also includes a new feature called Smart Tags, small boxes that appear on-screen and offer access to features such as autocorrect or paste. The Office suite will have a Smart Tag customization tool so companies can customize tags for Office-based line-of-business applications.

Microsoft expects to have two beta-test version cycles for Office 10, with the second one later this year. Pricing has not been set. ◪

Microsoft Office additions

Microsoft last week unveiled Office 10, which includes new features targeted at establishing the productivity application suite as part of the company's collaboration lineup.

Feature	Description
Team Workspaces	Application to create Web sites where workgroups can share such things as documents, calendar events, and contact and task lists.
Native XML support	Excel and Access support XML as file format for integration with Web-based data.
Workflow tool	Visual tool for building applications incorporating Exchange, Office and Tahoe document management server.
Document routing/review	Collaborative document creation and review allows files to be shared and multiple copies to be merged into a single file.

Big Blue boosts mainframe management

BY MARC SONGINI

IBM is trying to ease management headaches for mainframe users.

The company this week is expected to announce a new hardware console that will shrink the cost and floor space required for IS staff to create and manage logical partitions (LPAR) on their mainframes. The firm also last week introduced software that will help IS staff manage and monitor mainframe-based IP resources.

The hardware device, the 2074 Console Support Controller, is based on IBM's Netfinity PC server. The console could save users hundreds of thousands of dollars in setting up and monitoring LPARs, depending on the network, IBM says.

Most S/390 shops rely on LPAR technology, which lets mainframes run multiple copies of an operating system inside one machine as if they were individual physical servers.

The only way to set up LPARs today is via IBM's 3174 Establishment Controller, a hardware console the size of a small refrigerator that costs up to $15,000. Each LPAR requires its own 3174, which could take up a lot of floor space. A 2074 costs $30,000 to $45,000 and handles up to 32 LPARs.

The 2074 can attach to two mainframes via Enterprise System Connection, IBM's S/390-based 17M byte/sec channel technology, says Pete McCaffery, program director for S/390. It can also link to an Ethernet or token-ring network, permitting administrators to create and monitor LPARs from anywhere within a LAN. It also provides a tn3270-based graphical user interface for administrators, instead of a legacy green-screen terminal, so staff not trained on the 3174 can use it.

One IBM customer sees the 2074 as having a lot of potential for saving floor space and expense associated with the 3174. Bill O'Donnell, a senior IS consultant with the state of Wisconsin's mainframe-based information services department in Madison, calls it a "great win" for users looking to replace 3174 technology.

The 2074 will be available by the end of this month.

In other S/390 news, Tivoli last week announced it is offering the NetView Performance Monitor for TCP/IP. NetView is IBM's flagship network management software, but it has lacked the capacity to monitor and manage IP performance levels on a mainframe or attached routers. The Performance Monitor comes as a module that sits on an S/390 running IP. Using SNMP and other methods, it receives information about IP resources and presents it to IS staff through a Windows-based client.

The monitor also watches how IP stacks are affecting CPU utilization on a mainframe, as well as end-user response and file transfer times.

Data center staff can also set acceptable performance thresholds and receive alerts when these are violated, as well as issue pings and SNMP commands to manage the S/390 IP stacks.

The product will be available in September, and pricing will be based on configuration, IBM says. ◪

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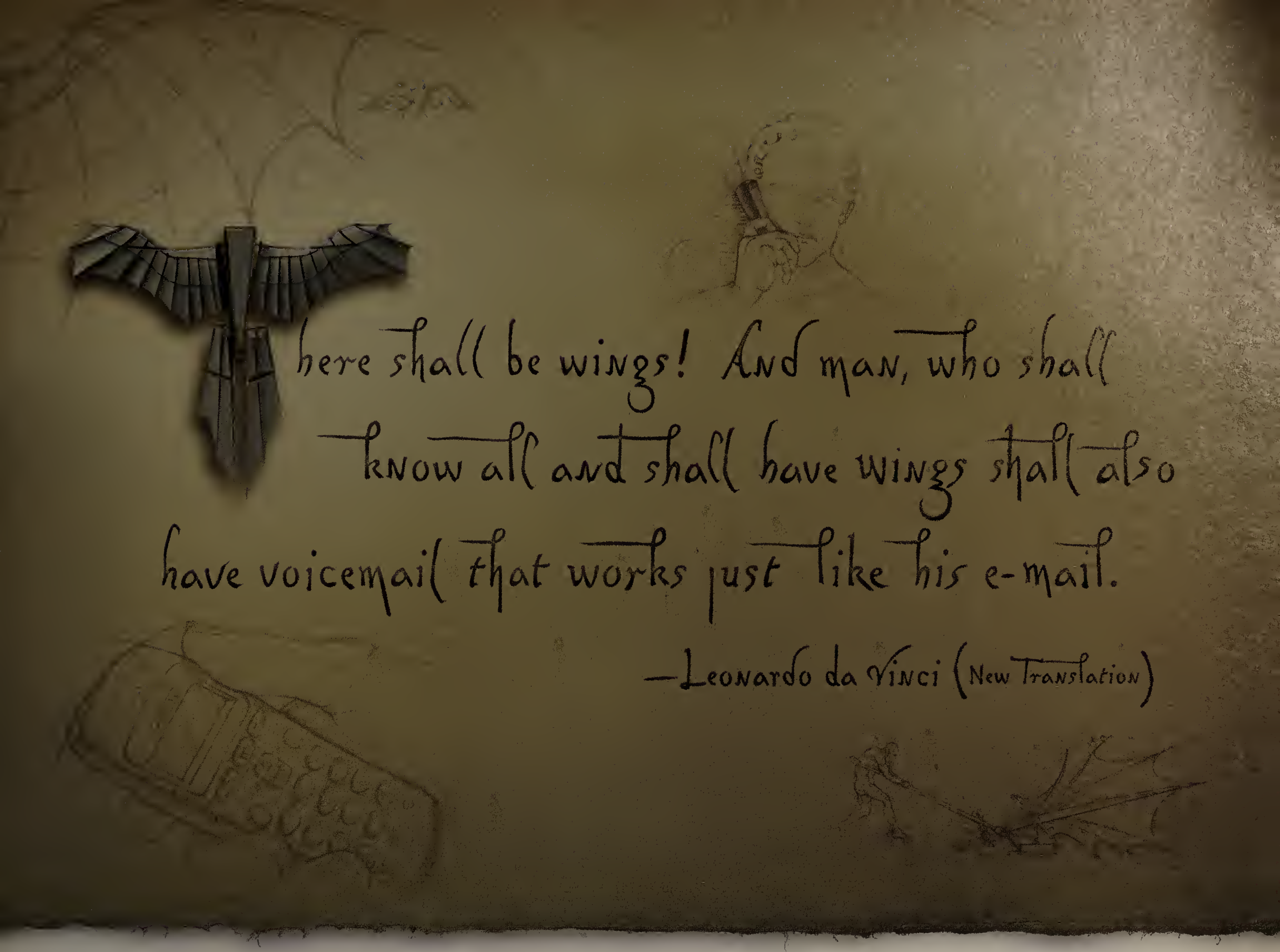
What's the new name of network software provider Harris & Jeffries?


There shall be wings! And man, who shall know all and shall have wings shall also have voicemail that works just like his e-mail.
—Leonardo da Vinci (New Translation)

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Cisco beefs up SNA management products

BY MARC SONGINI

SAN JOSE — Cisco is expected to revamp its CiscoWorks Blue management software to help IS staffs that are still migrating from SNA to IP.

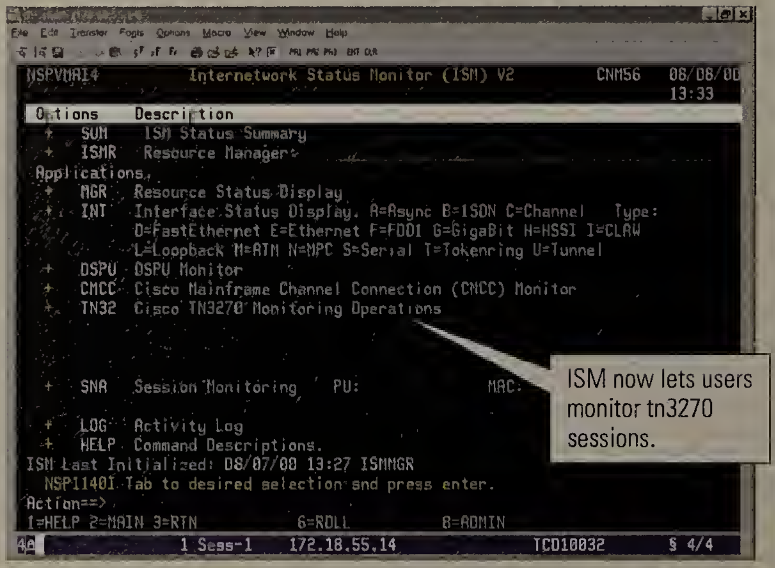
The enhancements speed the time it takes to discover SNA devices and servers in a network by as much as tenfold. Other changes let IS staff manage new types of datastreams and network gear.

Most significant for mainframe users is the upgraded CiscoWorks Blue Internetwork Status Monitor (ISM), Version 2.0.

ISM sits on a mainframe and lets data center personnel monitor Cisco IP devices. The new version of ISM will include a Web-based management graphical user interface (GUI); currently, users rely on the ISM 3270 screen. With the GUI, users not trained on legacy green screens will be able to operate ISM, says Sudhir Nath, a network management product manager at Cisco.

ISM upgrade

CiscoWorks Blue ISM has received a variety of enhancements to let users track non-Cisco gear, such as the IBM OSA card.



```
NSPVMAI4          Internetwork Status Monitor (ISM) V2          CNM56    08/08/00
                                                                         13:33
 Options    Description
  +   SUM    ISM Status Summary
  +   ISMR   Resource Manager
 Applications.
  +   MGR   Resource Status Display
  +   INT   Interface Status Display. A=Async B=ISDN C=Channel   Type:
            D=FastEthernet E=Ethernet F=FDDI G=GigaBit H=HSSI I=CLAW
            L=Loopback M=ATM N=MPC S=Serial T=Tokenring U=Tunnel
  +   DSPU  DSPU Monitor
  +   CMCC  Cisco Mainframe Channel Connection (CMCC) Monitor
  +   TN32  Cisco TN3270 Monitoring Operations


  +   SNA   Session Monitoring     PU:                  MAC:

  +   LOG   Activity Log
  +   HELP  Command Descriptions.
ISM Last Initialized: 08/07/00 13:27 ISMMGR
  NSP1140I Tab to desired selection and press enter.
Action==>
1=HELP 2=MAIN 3=RTN          6=ROLL          8=ADMIN
4A          1 Sess-1    172.18.55.14                TCD10032       § 4/4
```

ISM now lets users monitor tn3270 sessions.

Also coming is the ability to use SNMP commands to manage and monitor Cisco switches and even non-Cisco gear, such as IBM's Open Systems Adapter (OSA). OSA is a card that directly links a mainframe with a LAN. Previously, ISM could only talk to a proprietary "Service Point" interface on a Cisco router; now users can rely on a console to manage a greater variety of devices.

Other improvements to the ISM code let it monitor tn3270 traffic and ensure that specific sessions are up and running, which was not possible before, Nath says.

One beta tester who requested anonymity says the new browser interface for ISM "broadens the audience" for the product. It will make it easy for IS staff not trained on 3270 panels to run ISM using point-and-click browser operations, he says. However, Cisco should make the browser's color scheme and fonts customizable for users, he adds. Some mainframe shops that have been hesitant to use ISM because it relied on proprietary Cisco commands may find it more attractive now that it supports SNMP, he says.

ISM 2.0 will be available this month for $20,000.

The company is also beefing up the performance of its CiscoWorks Blue SNA View and its CiscoWorks Blue Maps products, which are being upgraded to Version 3.0. CiscoWorks Blue SNA View sits on a Unix server and lets an IS staff conduct SNA troubleshooting and diagnosis in mixed SNA-IP-based networks. For instance, CiscoWorks Blue SNA View lets users match SNA and IP traffic streams and locate the source of SNA session failures. CiscoWorks Blue Maps also sits on a Unix box and lets users manage mixed SNA-IP networks while guaranteeing that SNA service levels are being met.

Cisco has tweaked the code in both products so they can discover SNA network topologies faster than before, Nath says. SNA devices or hosts that might have taken an hour or more to find now can be located in minutes, which can speed critical troubleshooting processes.

Cisco has also ported CiscoWorks Blue SNA View to Windows NT. Previously, SNA View only ran on Unix servers, which can often cost thousands of dollars more than Windows boxes. Additionally, this will allow non-Unix-trained personnel to operate the software.

CiscoWorks Blue SNA View 3.0 and CiscoWorks Blue Maps 3.0 will be available this month and cost between $10,000 and $20,000.

Cisco: www.cisco.com

Group to promote voice over broadband

Members will focus on making their equipment interoperable.

BY MICHAEL MARTIN

RICHARDSON, TEXAS — Several equipment vendors last week publicly launched a group whose goal is to hasten the rollout of voice over broadband by working to make broadband voice equipment interoperable.

The group, called Open Voice over Broadband (OpenVoB), will provide a series of architectural options and interoperable equipment implementations for carriers and vendors. Broadband equipment that will be tested includes DSL, cable and wireless technologies.

OpenVoB was formed to address the concerns of service providers that have been hesitant to deploy the first generation of voice-over-broadband products, which are largely proprietary, says Brian Henrichs, vice president of new business development for OpenVoB member General Bandwidth.

"A lot of people claim to be interoperable with everyone else," Henrichs says. "Sometimes that's just a claim."

Even if there is basic interoperability, certain calling features, such as call waiting, may not work if there is more than one vendor's gear involved, he adds.

With interoperability testing, service providers will have a standard to which they can hold equipment vendors, Henrichs says.

Adam Guglielmo, an analyst with TeleChoice in Denver, believes OpenVoB could help advance broadband voice.

"It's important to get voice over broadband accepted by the big carriers, and one of the things they're concerned about is interoperability," he says.

However, Guglielmo adds that voice over broadband won't likely take off until more second-generation products become available. He also notes OpenVoB is missing key gateway and chip players, as well as big guns such as Lucent and Cisco.

"If [OpenVoB] is going to mean something, they need all these guys on board," he says.

OpenVoB interoperability testing will begin in December. The results of the tests will be available to OpenVoB members and service providers only, Henrichs says.

OpenVoB consists mostly of vendors that produce broadband voice customer premise equipment (CPE) gear, or carrier-side broadband voice gateways. Henrichs says this is because CPE and gateway manufacturers are the most important players in the voice-over-broadband process, since voice is only treated as a different traffic type between the gateway and CPE.

But the group is fully open and is looking to add new members, he says.

Henrichs believes DSL Access Multiplexer vendors could become involved later in the interoperability process as OpenVoB begins to look at flow-through quality-of-service provisioning from the DSLAM through to the CPE.

OpenVoB was formed in January, but Henrichs says the group didn't want to introduce itself until it had a significant number of members and had completed some interoperability testing plans.

Henrichs stresses OpenVoB is not a standards body. It will work with standards developed by the ATM Forum and DSL Forum in its interoperability testing.

OpenVoB: www.openvob.org

Vendors pushing voice onto broadband

The goal of Open VoB is to ensure voice-over-broadband equipment from different vendors is interoperable. Members include:

- Intel
- ishoni Networks
- Netopia
- Accelerated Networks
- Broadband Gateways
- Avail Networks
- Cayman
- Convergent Networks
- General Bandwidth
- IPCell
- Santera
- Woodwind Communications

Correction

A story (Aug. 28, page 22) incorrectly reported that Enterasys Networks is planning an IPO in November. While the company is planning to go public, it has yet to announce an IPO date.

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Alteon buys Bluetail to bolster Web switching box

Will use the Swedish Internet start-up's application processing technology to add smarts to its core line of switches.

BY APRIL JACOBS

FRAMINGHAM, MASS. — In a move aimed at packing more features into its Web switches, Alteon WebSystems announced plans last week to purchase privately held Bluetail, a Swedish Internet start-up, for $156 million.

Alteon itself is in the process of being acquired by Cisco. Selena Lo, vice president of marketing and product development, said the acquisition should be completed in October, sooner than expected.

Bluetail makes content-intelligent traffic management software for high-volume Web sites.

The company's core technology is a software-processing engine that can identify different types of Web traffic and process that traffic based on policies set by network managers and the types of applications used.

Switches turn up growth

The market for Layer 3 through Layer 7 switches is up to $4.6 billion for 2000 — that's 135% growth from 1999.

SOURCE: GARTNER GROUP, STAMFORD, CONN / DATAQUEST, SAN JOSE

Lo says that Bluetail's technology will enable Alteon to add many new features to its switches, such as the ability to automatically scan e-mail for viruses before it is sent to end users. In a corporate network setting, this simplifies the job of having to manually install and maintain virus-scanning software on PCs. For ISPs and other hosters offering free e-mail services, the new features could be used to support premium services. In this case, subscribers might pay extra to get automatic virus scanning.

Eric Thompson, an analyst at Gartner Group/Dataquest, says Bluetail-inspired features will simplify network managers' jobs and save money. Companies can save by using Web switches to perform virus scanning and other functions, such as encryption and decryption, leaving Web servers free to process dynamic page requests.

He also notes that switches can typically perform these specific tasks more quickly than a Web server because they have Application Specific Integrated Circuits designed to do the job.

Current Analysis analyst Ron Westfall says by moving time-consuming, virus-software-related tasks to an intelligent switch, IT staff can focus on other areas. Bluetail's software also lets network managers prioritize Web traffic and customize content based on user profiles.

Lo says Bluetail's software technology will be integrated into a suite of new applications the company is developing for Alteon's Integrated Service-Director platform.

Bluetail was founded in January 1999 and is fairly well known in the open source world for its invention of Erlang — an open source programming language aimed at distributed systems and used to develop a variety of Unix-based applications.

Alteon: www.alteonwebsystems.com

Content delivery alliance to set up peering

BY APRIL JACOBS

Hoping to make today's content delivery networks compatible, Cisco and a slew of service providers last week formed The Content Alliance.

The group will develop open standards and protocols to support new content network services and technologies such as content peering, which lets the content delivery networks of multiple service providers work together.

For users, content peering means faster Web and e-commerce site performance because content can be delivered from devices closest to surfers. Peering also eases the work of network managers because they can work with a single service provider but gain the reach of combined peered networks.

The Content Alliance includes Cable & Wireless, Digital Island, Exodus, Genuity, Global Center, Mirror Image Internet, NaviSite, PSINet and ServInt, as well as Network Appliance. Content delivery pioneer Akamai Technologies is not currently a member.

Vendors in The Content Alliance:

Cisco
Cable & Wireless
Digital Island
Exodus
Genuity
Global Center
Mirror Image Internet
NaviSite
PSINet
ServInt
Network Appliance

Observers say content peering is an inevitable consequence of the demand for simpler and more reliable services — a job that requires service provider cooperation.

"What we are seeing is the migration back to a distributed architecture," says Gartner Group/Dataquest analyst Eric Thompson. "You want to put content as close to end users as possible, and in order to do that you have to get content in the countries or regions where those users are," he says.

The Content Alliance is also developing standards to bill across multiple content delivery networks.

The alliance plans to test and endorse a content peering standard and submit the draft standard to the Internet Engineering Task Force later this year.

As part of its content delivery strategy, Cisco also announced products aimed at content delivery network providers. Those products, which will be available by October, include content distribution management appliances and routers.

Cisco: www.cisco.com

Trojan horse invades Palm; observers fear imitators

BY ASHLEE VANCE

The first known Trojan horse aimed at handhelds has struck PalmPilot users.

The Liberty Crack program, a Trojan horse, appeared as a free version of Gambit Studios LLC's Liberty GameBoy emulation software for Palm. When Liberty Crack executes, it can delete the applications on a Palm device.

A Trojan horse is a malicious program that appears to be legitimate and is often attached to free gaming software.

Trojan horses can locate password information, make systems more susceptible to future entry, or sabotage data on hard disks. Trojan horses typically mimic legitimate programs but do not replicate themselves.

At the moment, the Trojan horse doesn't seem to warrant too much concern. A fix has been posted and Palm users have the ability to synchronize their devices with their PC to retrieve lost data.

Pave the way for hackers

Virus experts at Network Associates' McAfee division, however, claim this initial incident may pave the way for hackers interested in attacking increasingly popular PDAs and other wireless devices.

The antivirus software vendor recently released its VirusScan Wireless product in what it says was an anticipation of this type of hacking event.

Ryan McGee, product-marketing manager at McAfee, says the Timofónica virus released in Spain in July gave the first hint that attacks were being aimed at PDAs and handhelds. The Timofónica virus could send copies of itself to contacts in a victim's address book and then send short messages to mobile phones. With the virus making its way into wireless devices, McGee says McAfee began work on an antivirus scanner.

"As an application or device gains popularity, it becomes an attractive target for virus writers," McGee says. With that in mind, McAfee developed software to scan the Palm operating system as well as rival offerings, such as Symbian's EPOC operating system and Microsoft's Windows CE operating system.

McGee says he would not be surprised to see the first full-fledged virus directed at PDAs within a year. The more-advanced memory capabilities of these devices make them an immediate target, McGee notes, adding that cell phones also may face similar tests in the future.

"Any time a device has the capability to access a network or another device, it is dangerous," he says.

Vance writes for IDG News Service.

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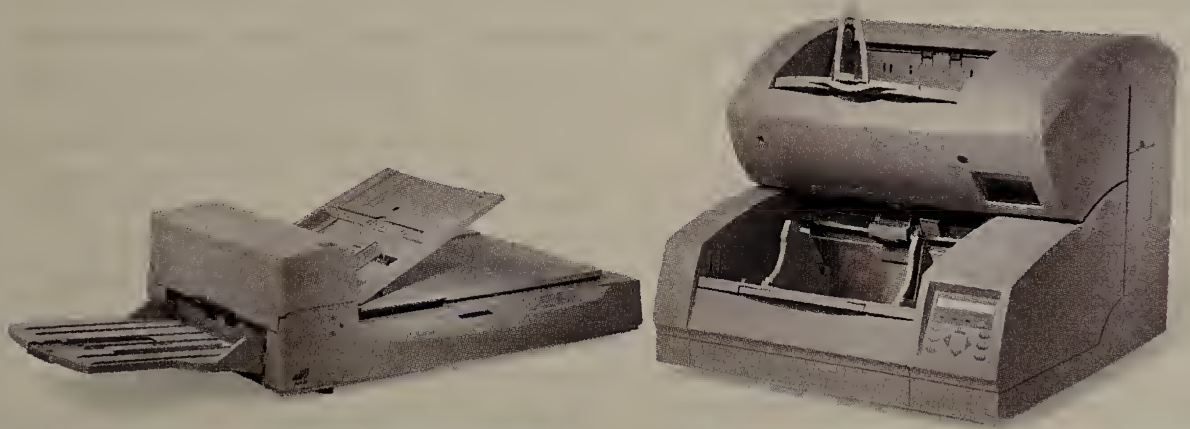

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Common,
continued from page 1

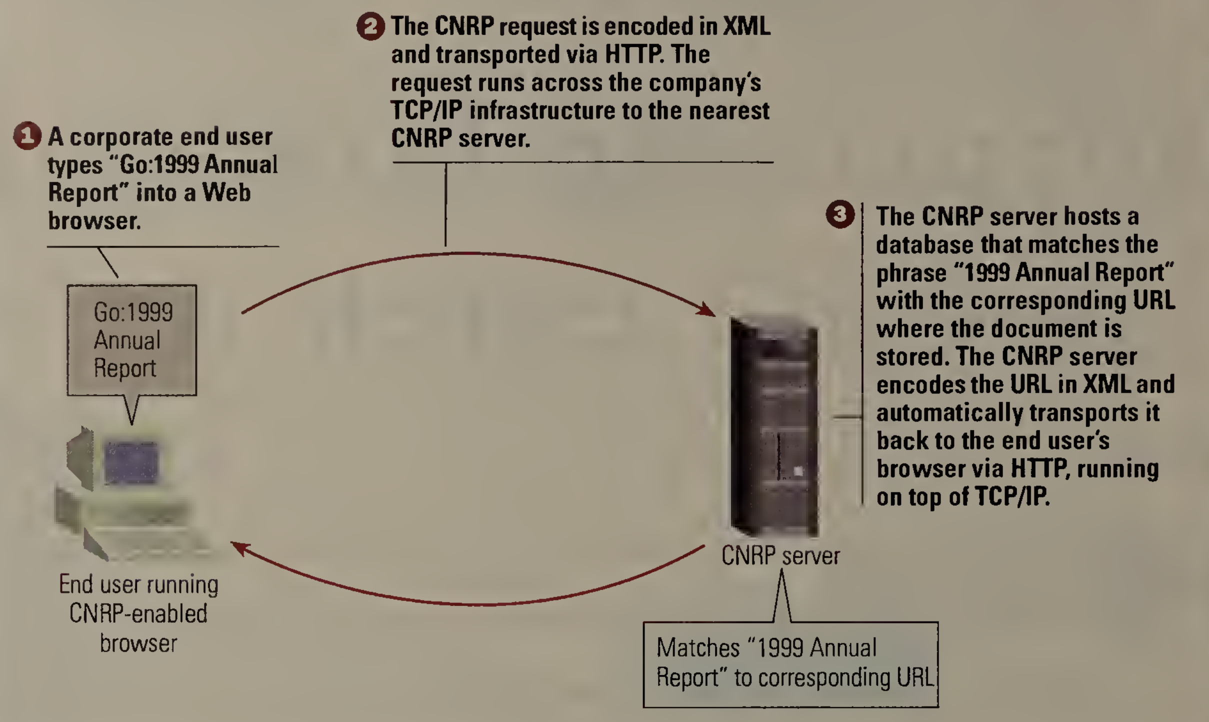
Names, Netword and AT&T. Today, Network Solutions is releasing a beta version of its CNRP software for Internet users to try. RealNames and Netword will roll out commercial versions of CNRP later this fall.

Network managers can tap CNRP to improve the usability of their intranet and Web sites. With CNRP, corporate end users can access information about their 401(k) plans by typing "401K" into the address line on their browsers. They can send e-mail to coworkers by entering the recipients' first and last names. On e-commerce Web sites, customers can locate products by their names.

CNRP would provide "much better navigation for a Web site," says Raj Pareek, manager of e-government services for the city of Boston. Pareek's team develops content for Boston's Web site, which boasts 12,000 Web pages and 95,000 users per month, as well as an intranet used by city government employees.

"People call us and say: 'Where is a Web page located?' And we have to tell them a long name with backslashes and forward slashes," Pareek says. "It would be nice to have a very easy way to name and reach that location."

How the Common Names Resolution Protocol (CNRP) works



Go:1999 Annual Report
End user running CNRP-enabled browser
CNRP server
Matches "1999 Annual Report" to corresponding URL

❶ A corporate end user types "Go:1999 Annual Report" into a Web browser.

❷ The CNRP request is encoded in XML and transported via HTTP. The request runs across the company's TCP/IP infrastructure to the nearest CNRP server.

❸ The CNRP server hosts a database that matches the phrase "1999 Annual Report" with the corresponding URL where the document is stored. The CNRP server encodes the URL in XML and automatically transports it back to the end user's browser via HTTP, running on top of TCP/IP.

A friend to wireless

Because it supports pithy names and phrases, CNRP may be useful in wireless applications "to accommodate for handhelds' small screens" and limited keyboards. For example, a CNRP service could let Palm device users check stock prices by entering a company name rather than an obscure stock listing.

> **"Domain names and URLs are not that human friendly. They're unique, and they require a certain syntax. We don't talk to people in dots and dashes and colons."**
>
> Michael Mealling, research manager, Network Solutions

"Domain names and URLs are not that human-friendly. They're unique, and they require a certain syntax. We don't talk to people in dots and dashes and colons," explains Michael Mealling, a research manager at Network Solutions and a CNRP developer. "CNRP could be used for the next-generation naming services, to make the Internet naming system much more natural."

CNRP lets client applications such as Web browsers communicate with common name resolution services hosted on servers connected to the Internet or private networks running Internet protocols. The services would match a company or document name to the corresponding URL and serve that URL back to the end user (see graphic, above).

In corporate environments, network managers can create CNRP services for accessing information about employees and customers or for sharing corporate documents.

"CNRP would help enterprises immensely by giving access to corporate resources using standard words and phrases rather than the often excruciatingly complex URLs," says Marshall Mosely, vice president of product management at Netword and a CNRP developer.

On the Internet, end users could create common names much as they do bookmarks. Individuals and organizations could register common names for themselves along with details about their locations or businesses so they could be easily found should multiple people register the same common name.

"The promise of CNRP is that it will foster the development of new services," says Nicholas Popp, chief technical officer at RealNames and a developer of CNRP. "There will be easier-to-navigate, easier-to-search vertical databases coming out for books or movies or [music files.] You'll be able to put in your favorite song title and find it on the Web."

Specification coming

After a year of work, CNRP developers will publish a final version of the protocol specification this month. The leadership of the Internet Engineering Task Force (IETF) is expected to approve CNRP as a standards-track protocol this fall. Then CNRP will be stable enough for developers to begin creating applications that support the protocol.

The one remaining technical challenge for CNRP is dealing with internationalized domain names, says Leslie Daigle, who chairs the IETF working group on CNRP. She says the group plans to use a standard character-encoding scheme that supports most languages.

Hitting the market

Meanwhile, CNRP-based services are starting to hit the market.

Network Solutions is providing a free, downloadable CNRP browser plug-in for Microsoft's Internet Explorer. The plug-in lets users register common names into a database for future access. Network Solutions is working on a similar plug-in for Netscape's Mozilla browser, Mealling says.

Mealling anticipates this CNRP pilot project will run for about six months.

"We're doing this as a learning experience," Mealling says. "We're making it available to the public so we can learn enough about it to decide what we want to do to productize it."

RealNames will support CNRP in its Internet keyword service starting in October. With the RealNames service, Internet keywords start at $100 per year for 1,000 keyword-driven visits. Higher-volume corporate offerings also are available.

CNRP will eventually replace the proprietary protocol that

See **Common**, page 80

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Briefs

3Com and **VIA Technologies**, a maker of PC logic chipsets, announced a partnership to integrate 3Com 10/100M bit/sec LAN controller technology into VIA's chipset products. Chipsets are components on a PC motherboard that let the CPU, memory and I/O devices communicate. Having network logic built into the chipset could lower manufacturing costs for PC makers and allow for cheaper networked computers. Major PC manufacturers are expected to start shipping integrated PCs with the integrated LAN technology next spring.

3Com: www.3com.com; VIA Technologies: www.viatech.com

Dell rolled out a storage-area network (SAN) appliance this week that lets users move data between remote and local locations on enterprise networks. Dubbed the PowerVault 530F SAN, the appliance lets data be replicated from site to site, providing increased fault tolerance and availability. The appliance uses software from StorageApps that allows point-in-time copy capabilities in which a snapshot of the data is taken and copied to another disk for backup. The PowerVault 530F SAN is available now starting at less than $50,000.

Dell: www.dell.com

NetBotz is testing a hardware and software appliance that lets network managers monitor the temperature, humidity and airflow of servers and other network devices in a server room. The appliance, called NetBotz/Rack or NetBotz/Wall, connects to the network via an Ethernet connection and uses SNMP to gather information about the condition of network equipment necessary to keep your server room up and running.

NetBotz: www.netbotz.com

Enterasys touts centralized mgmt.

BY PHIL HOCHMUTH

Cabletron spinoff Enterasys Networks last week released a pair of tools focused on managing network equipment and network policies in large companies.

NetSite Element Manager and NetSite Switch and Topology Manager are geared toward enterprise network professionals who want centralized control over network equipment configuration, security and troubleshooting, as well as quality-of-service-based policy administration.

Element Manager includes features such as network troubleshooting, security, performance monitoring and alarm configuration. A graphical user interface (GUI) provides a complete map of a company and lets users click on icons to view and configure any SNMP-based device on the network. The software can also export network data for generating performance reports.

Element Manager can control devices down to the port level, allowing unused or insecure ports to be identified and shut off remotely. Unused ports are a common avenue for hackers to gain access into a network and scope it out before doing damage, says Robert McGloughlin, product manager for Enterasys.

"Hackers can't learn about your router tables, server IP addresses or how many hoops they went through on your net if they have no way of getting in," he says.

Switch and Topology Manager gives a broader view of the network, letting users apply policies and access privileges to specific user workgroups or a network.

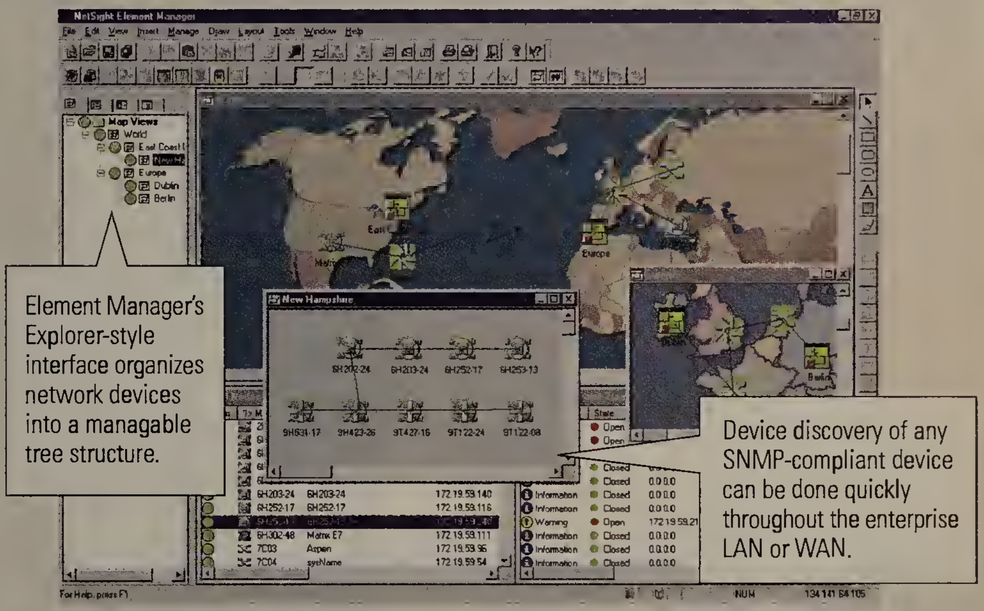
Switch and Topology Manager uses virtual LAN management technology built on the IEEE 802.1Q standard. The GUI-based application can map out VLAN-based workgroups in a network and allows managers to apply network policies to a group by dragging and dropping rule icons onto the map.

Enterasys is mainly a maker of enter-

See **Enterasys**, page 22

New from Cabletron spinoff

Enterasys' NetSite Element Manager is a Windows-based management tool that gives users control over their network hardware.



Element Manager's Explorer-style interface organizes network devices into a managable tree structure.

Device discovery of any SNMP-compliant device can be done quickly throughout the enterprise LAN or WAN.

Start-up converging storage and IP

BY DENI CONNOR

LOS ANGELES — If the vision of storage start-up NetConvergence takes hold, network managers soon will be using Gigabit Ethernet switches, adapters and routers with iSCSI software to transport large blocks of data over IP networks.

NetConvergence, founded in 1998 by two veterans from Gigalabs, is writing software based on the prestandard iSCSI specification. A proposed standard from IBM, Cisco and Hewlett-Packard, iSCSI is entering working-group status within the Internet Engineering Task Force, with ratification anticipated next year.

NetConvergence's software can be ported to existing Gigabit Ethernet adapters, storage controllers or the blades of Gigabit Ethernet switches, allowing the use of low-cost, off-the-shelf hardware to implement storage over IP.

The product entered beta tests last year and is expected to ship early next year. Dubbed the Matrix Integrated Storage Gateway (ISG), it will let users implement iSCSI by upgrading their standard Gigabit Ethernet equipment, the company says.

"Matrix ISG is flexible, easy to manage and requires no or little change to our system," says Richard Muntz, chairman of the computer science department at UCLA. "We simply need to connect the servers with the gateway using regular SCSI cables and it is ready to go — the servers can access remote storage as a local device."

Muntz uses the Matrix ISG to back up 200G bytes of data each day.

NetConvergence has partnered with Accton Technology, a large Ethernet adapter vendor, but will be looking for other partners that want to implement Matrix ISG on their adapters, switches and routers. The company's software will also be integrated into network processors, chips optimized for performing communications functions that combine the best attributes of Reduced Instruction Set Computing microprocessors and Application Specific Integrated Circuits.

"ISCSI is going to be the standards winner, one way or another," says Steve Duplessie, an analyst with Enterprise Storage Group in Milford, Mass. "NetConvergence is early enough in the game to potentially dominate an area where sooner or later every storage and networking product will have an iSCSI chip."

NetConvergence: www.netconvergence.com

"If someone tells you it takes only 5 minutes to install up to 240GB on the network, DON'T BELIEVE IT."

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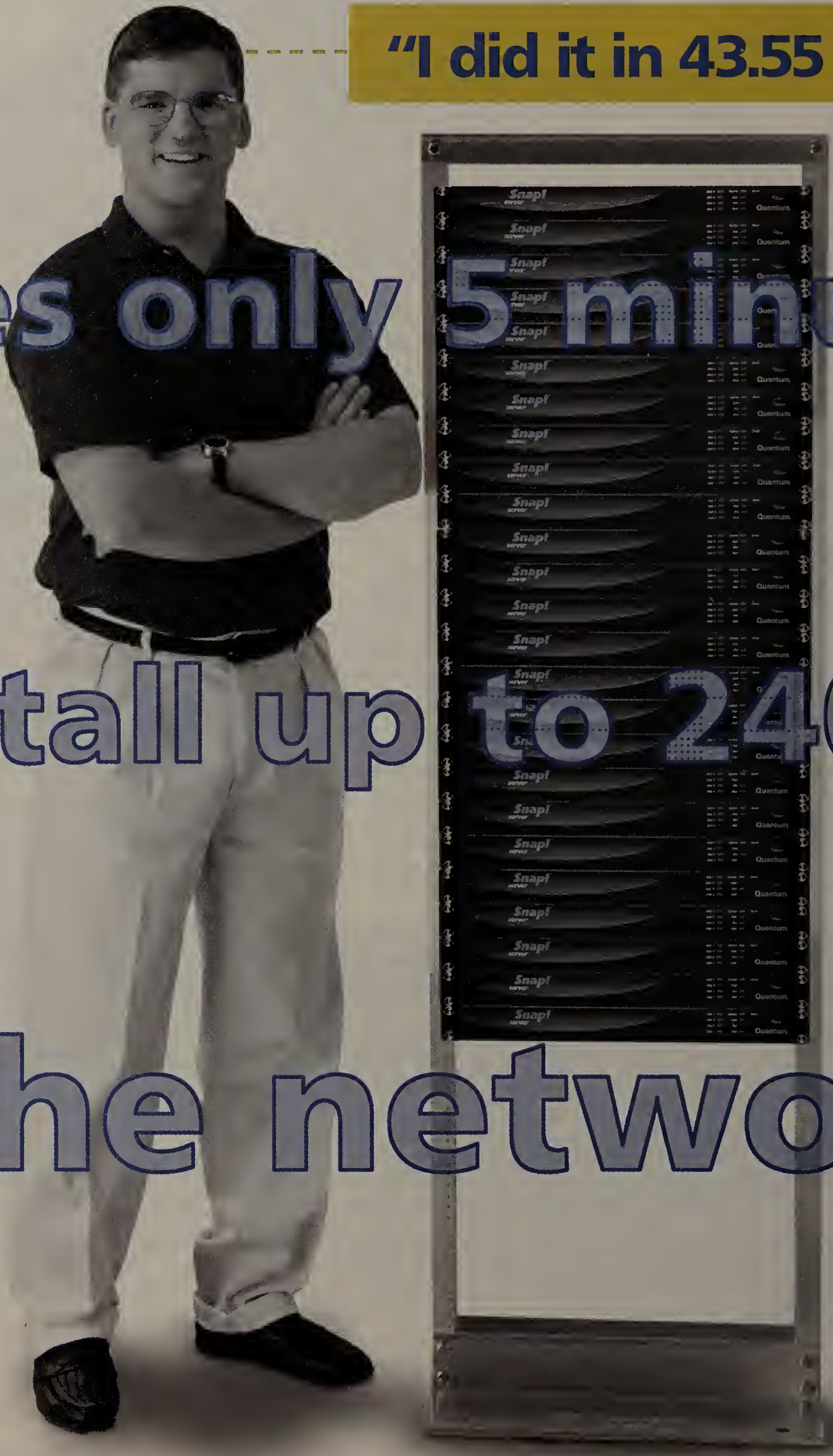
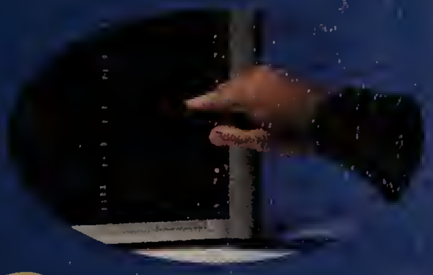


1 Plug into AC power

2 Connect to Ethernet hub



3 Turn Snap Server on

Don Knisley, Network Engineer, US Air Force

Snap Servers are engineered for one purpose: file sharing. That's why Don could have a Snap Server 2000 up and running on a LAN in 43 seconds! "If I had the choice of installing an NT server for network storage or a Snap Server, I'd pick the Snap Server," says Don. "It's fast, easy and the browser configuration tool is very intuitive." To read Don's story and virtually install a Snap Server yourself, visit www.snapserver.com/install today.

For a fraction of the cost of an NT file server, a Snap Server easily adds up to 240GB to your LAN – ideal for remote offices, departments or workgroups. According to a recent PC Data report, 4 out of 5 workgroup network attached storage (NAS) servers sold are Snap Servers and they are also the most awarded NAS product on the market today. So go with the industry standard. Quantum Snap Server.

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[illegible] the U.S. A[illegible] other countries. Snap! Server is a trademark of Quantum Corporation. [illegible] PC Data report [illegible] for hard disk workgroup NAS products under $5,000.

Tolly on Technology . **Kevin Tolly**

IS WINDOWS 2000 FIT FOR 'ALWAYS-ON' NETWORK APPLICATIONS?

Ubiquitous Internet access has made "always-on" applications much more common. It's not just hospitals and currency trading desks that demand nonstop computing anymore — it's now a requirement across many companies. Microsoft's, well, monopoly position in the operating system market has made Win 2000 a likely platform for such applications. But how fit is Win 2000 to handle such demands? From what I've seen, chief information officers had better look hard before giving the Microsoft software that job.

Bold advertisements about Win 2000 Professional's "crash-resistant" nature would indicate that Microsoft believes its new software is up to the task. The company declares unequivocally that test results show the operating system is 13 times more reliable than Windows 98. Windows 98!

Ouch. That is like saying a new defense system is many times more secure than the Maginot Line. Or having Al Gore say he's 13 times more faithful than his current boss.

Microsoft's claims notwithstanding, initial research into Win 2000's network capabilities by Tolly Research (a sister organization) seems to indicate that whatever inherent basic reliability exists, it drops significantly if you actually want to use Win 2000 to communicate with another device.

Tolly Research is conducting an ongoing study of Win 2000 networking. While not trying to ferret out bugs, the researchers have nonetheless uncovered bugs aplenty. The bugs are of minor importance; once identified, they can be fixed. More important is the general sense one gets of Microsoft's direction in key areas associated with "reliability."

Let's look at a few examples:

- Avoiding dead gateways. While the core of the Internet is robust, the edge is not. Traditionally, each endstation knows about just one "gateway" to the rest of the IP world. If that relay point becomes unavailable, outside communication ceases.

Network infrastructure vendors are on the case, though. In the past few years, through the Internet Engineering Task Force, it has developed and implemented the Virtual Router Redundancy Protocol (VRRP). This protocol adds significant resilience by letting another router port take over the identity of a failed port. We tested this and it works.

Microsoft has decided to solve the problem on its own by having Win 2000 detect the outage and choose an alternate gateway. Network architects might be lulled into thinking this obviates the need for VRRP.

Such is not the case. Many months of research show the Microsoft solution to be poorly conceived, documented and implemented. Sometimes it works, sometimes it doesn't — hardly ideal for "always-on" applications.

- Strengthening the server link. Link aggregation is an industry-standard method for having two or more server network interface cards (NIC) behave as one. In addition to the bandwidth benefits, this approach removes the NIC, cabling and switch ports as a single point of failure.

Tolly Research studies show hardware vendor support for this function to be weaker under Win 2000 than under NT 4. Worse, using the link aggregation of a major NIC vendor, engineers can get Win 2000 server to "blue screen" like clockwork. With another, failover works but overall bandwidth delivery is weak.

When implementing Win 2000 reliability features actually reduces reliability, it is clear that a much closer look at this software is in order.

Tolly is president of The Tolly Group, a strategic consulting and independent testing firm in Manasquan, N.J. He can be reached at ktolly@tolly.com or www.tolly.com.

Enterasys,
continued from page 19

prise network switches, routers and VPN equipment. The company is marketing its NetSite products as complementary tools to its network gear product lines, but both software products can manage standards-based network equipment from other vendors, McGloughlin says.

Unlike the Spectrum management product sold by Aprisma — another Cabletron spinoff — the NetSite products are focused more on managing the network, McGloughlin says. Management products such as Spectrum and those from Hewlett-Packard and IBM/Tivoli can control an array of areas, such as PBXs, servers and application management, but they do too much, McGloughlin says. "We're not trying to be everything to everybody," he says.

Industry research firm IDC in Framingham, Mass., predicts worldwide revenue for enterprise network management software will drop from $1.4 billion this year to $1.2 billion in 2003. The firm expects network management software to become more of a commodity for large businesses, causing prices — and vendor revenues — to drop. The trend toward network management outsourcing is also a factor in the cooling off of this market, IDC says.

Element Manager is priced at $5,000 and Switch and Topology Manager at $11,000. The products, available now, can be combined or work alone.

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Carriers & ISPs

The Internet, Extranets, Interexchange and Local Carriers, Wireless, Regulatory Affairs

Briefs

SBC Communications is hiring Nightfire Software to link SBC's electronic ordering system to the ordering systems of DSL competitors that need to lease SBC phone lines. The arrangement is designed to shorten the time it takes for competitive carriers to get customer DSL services up and running. Nightfire will link its ordering system to SBC's and then customize connections to the ordering systems of competitive DSL providers. SBC and other traditional local carriers have been criticized for taking too long to deliver lines.

SBC Communications is expanding its self-installation option for DSL customers in the former **Ameritech** service region. Customers will have the option to save on installation fees by configuring and plugging in their own DSL gear rather than having an SBC technician drive out to do it. This also saves SBC money and time. The option is possible because SBC is running DSL on the same wires as phone service.

Managed service provider **LMKI** is rolling out redundant connectivity offerings to improve reliability for its broadband customers. LMKI's redundant DSL lets customers use connections from multiple local exchange carriers to connect to the Internet or LMKI's national private network. The redundant DSL product works with other DSL connections, T-1 lines or frame relay, and is configured to fail over in a service outage. LMKI customers can also use the redundant DSL service to provide a single, faster connection when it isn't being used in failover mode.

LMKI: www.lmki.net

Genuity prefers flying solo . . . for now

BY DENISE PAPPALARDO

BURLINGTON, MASS. — Change is considered good at Genuity, which is the right attitude to have if your company is on its third metamorphosis.

Genuity is the result of GTE spinning off GTE Internetworking to see its merger with Bell Atlantic through regulatory approval. Now without the heavy hand of a huge telecommunications parent, Genuity is trying to find its path as a large independent ISP.

Genuity CEO Paul Gudonis says independence provides opportunities.

"Now we're a $2 billion independent company, where we were a $1 billion division of a $25 billion company," says Paul Gudonis, Genuity CEO and chairman. The ISP's IPO in June raised more than $2 billion.

Genuity is one of only a few large independent ISPs in the country. PSINet is the only other of the top 10 ISPs not owned by another company. Genuity is also one of the more successful ISPs, thanks to its GTE Internetworking and BBN Planet legacy.

Ranked third among ISPs in sales, Genuity brought in $301 million in business access service revenues last year, trailing only UUNET's $1.3 billion and AT&T's $720 million.

While successful, the ISP has gone through an identity crisis since being acquired by GTE, says Joel Yaffee, an analyst at Cambridge, Mass., consulting firm Giga Information Group. Genuity needs to become more aggressive to prove itself to shareholders, he says.

"Genuity is now getting the opportunity to flex some of its muscles," Yaffee says.

That should be doable now that Genuity has its own ready source of cash.

"We have expanded our capital investment program substantially, and we're able to strike deals even more quickly," Gudonis says.

However, the company's stock has been suffering the same ills as many Internet stocks these days.

"Genuity's post-IPO stock performance has been lackluster," Yaffee says. "Post-IPO performance is a measuring stick, but it can also be an indication that the stock was priced just right. Nevertheless, many expected more demand for the stock instead of it hovering at or below asking price."

What the ISP has that most other recent IPO companies don't is the added comfort that its parent is not too far away. GTE and Bell Atlantic, now known as Verizon, own 9.5% of Genuity. More important in the long term is that Verizon will be permitted to transfer another class of stock it holds to constitute a majority ownership of the company. This will happen once it receives permission to offer long-distance services from the Federal Communications Commission in 95% of Bell Atlantic's regions by 2002. Permission is granted or denied after service providers file for 271 approval, which covers long-distance service.

"Verizon is making good progress on getting its 271 approval and will likely get to the point where it will retain ownership of Genuity," says Pat Hurly, an analyst with TeleChoice, a consulting firm in Boston.

In the meantime, the ISP is moving forward. Since its IPO, the company has struck alliances and partnership deals with Hewlett-Packard, Netigy and content distribution services companies Adero and Inktomi.

"It's easier to strike deals because we have a streamlined decision-making process now as an independent company," Gudonis says.

While Genuity is limited because it

See **Genuity**, page 26

NorthPoint Communications targets SOHO market

BY MICHAEL MARTIN

SAN FRANCISCO — NorthPoint Communications is targeting the small-office, teleworker and multi-PC home matters with a business-class DSL service designed to support two to four users.

NorthPoint's Small Office Professional product offers a choice of two routers with built-in security features from Efficient Networks and Ramp Networks, a four-port hub, and speeds of up to 784K bit/sec.

Adam Guglielmo, an analyst with consulting firm TeleChoice in Denver, says NorthPoint is the only major DSL provider he's aware of that offers a bundled DSL product for the small-office market. But he believes other providers will have to come up with competing products soon.

"It's nice for end users with multiple computers, because they can just plug into a single port from their DSL provider," he says.

The security provided by the router is also important, Guglielmo notes, because DSL is an always-on connection with a static IP address, making it more vulnerable to hacking than a dial-up connection.

NorthPoint spokeswoman Nicole Burnett says the company is launching Small Office Professional because the small office/home office market is growing quickly. She quotes statistics from an IDC study that reveal more than 50% of small businesses will have five or fewer employees and a Yankee Group study that concludes the home-office market will grow to 29.8 million households by 2003.

Small Office Professional is available immediately in all 99 metropolitan areas served by NorthPoint's U.S. network. Pricing is up to individual retailers, Burnett says.

NorthPoint: www.northpointcom.com

OFFICE WORK
A look at Intel's competing product.
A SOHO firewall review.
DocFinder 9728 find it online

Eye on the carriers . **David Rohde**

SOLVING THE BRANCH-OFFICE DILEMMA

There was a time when the Bell companies and their apologists in Congress could dismiss the rise of competitive local exchange carriers as a bonanza only for large corporate users.

CLECs were "cream-skimmers," went the refrain. They only want the gold-plated Fortune 500 accounts, the critics said. They specialize in high-speed data services. They couldn't care less about smaller businesses, much less consumers. Only Bells are interested in serving the masses, so their privileges should remain written into law. And so on went the argument.

That's why it's so ironic to see the rise of the new crop of CLECs. They seem to turn the whole logic of competitive local service on its head.

Many of these new CLECs avoid big cities. They go after second- and third-tier markets. Repeatedly my colleagues and I at *Network World* receive pitches for new carriers serving "small and midsize businesses" (by which they often mean small businesses, period). Many of them, far from avoiding boring services like local dial tone, cherish the opportunity to provide it, although frequently over newer technologies like voice over IP or voice over DSL.

That sounds like an improvement in the telecom picture for society at large, but there's a downside.

Many CLECs that didn't grow up in the generation of MFS and Teleport — the two pioneering CLECs eventually bought by WorldCom and AT&T, respectively — really aren't involved in providing more fiber capacity. Some are pure resellers. Others buy loops from Bell companies and are still in the process of installing voice and data switches in collocation spaces.

And from the standpoint of customer service, many aren't even remotely set up to handle large corporate accounts.

Thus the possible dilemma for enterprise users. The hordes of CLECs that are sending sales reps out to the market are bound to run into branch offices of large companies. Or they're trying to sign up entire buildings where large companies may happen to have offices.

The Big 3 long-distance carriers do their best to sign up large users to more-or-less exclusive national contracts, either explicitly or via annual spending commitments that essentially bind customers to the carrier.

But newer local carriers are more likely to try to pack voice, intranet, VPN and Internet traffic onto a single symmetrical DSL line, so they might have just the ticket for certain branch offices. Some of the pricing packages I've seen are very attractive for offices with fewer than 50 lines.

To be blunt, some of these CLECs may not make it. A handful have gone bust this year and venture funding for telecom carriers has become a lot harder to come by. But if they stay in the game, your branch offices could eventually be besieged with offers, just as in the days when long-distance resellers with no facilities — which were simply grabbing cheap minutes off AT&T's discount tariffs — were dialing for dollars to any potential buyer they could find.

The question is whether organizations want to take a chance on the newest local carriers. Are they up to the challenge, or is it not worth the risk? Drop me a line if you have any thoughts.

Rohde is managing editor of The Edge section of Network World. *He can be reached at drohde@nww.com.*

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Genuity,

continued from page 25

cannot be the target of an acquisition, unless Verizon agrees, the ISP can make acquisitions. Genuity is putting more emphasis on e-commerce and Web hosting services, and the company's timing couldn't be any better, analyst Yaffee says. The ISP has a large enterprise customer base and must cater to that group with strong managed services and innovative hosting services.

These service enhancements were on hold while the ISP was working on its spinoff from GTE, Yaffee says.

Next month Genuity will roll out new service bundles that offer enterprise business users a complete e-commerce package including applications, hosting, network connectivity and security services, Gudonis says. Each package will concentrate on specific e-commerce initiatives such as creating business-to-business exchanges or large business-to-consumer Web sites and will be fully managed by Genuity.

Genuity is also developing a click-to-talk feature for its Web-hosting service customers. The feature will let consumers click on an icon on a Web site to speak directly with a customer service agent.

The ISP is working with wireless service providers to offer enterprise users secure, mobile wireless access to their VPNs, Gudonis says.

An emphasis on services for enterprise users is a positive move from a business and customer perspective. "Genuity is a good choice for users, but [the ISP] has to do a better job of letting people know it's out there," Yaffee says. "The only users who bring Genuity up with us are those who are former BBN customers. Many more aren't aware of the company."

The ISP seems to be aware that it is less than a household name. Gudonis says this fall the company is launching a multimedia ad campaign designed to change the perception in the market. ◪

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The Edge

Service provider developments at the juncture between the enterprise and the new public network

Briefs

Paradyne has introduced a small-chassis DSL Access Multiplexer (DSLAM) designed for multitenant unit (MTU) buildings. The four-slot, 48-port Hotwire 8620 GranDSLAM uses DSL port cards that are interchangeable with larger Paradyne DSLAMs. "Full-size DSLAMs are often just too big for MTUs," says Paradyne President Sean Belanger. Paradyne is also pitching the 8620 to small-market central offices and early-stage DSL deployments in general. The 8620 will be available in November starting at $2,595.

Accelerated Networks announced that one of its largest customers, Northeastern carrier CTC Communications, has signed on for an additional $10 million worth of equipment. CTC will take Accelerated voice gateways plus two of Accelerated's models of integrated access devices, including the recently announced AN-32, which supports up to 48 voice channels using inverse multiplexing over ATM. CTC serves business customers from Washington, D.C., to Maine.

Carrier Access Corp. last week unveiled its Adit 105 and 205 Customer Service Terminals, wall-mounted customer premise equipment designed to let carriers deploy voice and data over DSL services to small business and residential customers. Adit 105 and 205 features include remote management capability, battery backup, an Ethernet port and either eight or 16 telephony ports, and a lifeline capability that switches calls to a separate telephone line in the event of a DSL line failure. Carrier Access says the terminals are interoperable with leading DSL access multiplexers and ATM voice gateways.

Carrier Access: www.carrieraccess.com

Lucent's edge strategy hooks carrier

BY DAVID ROHDE

ST. LOUIS — Lucent is counting on a Midwest competitive local exchange carrier to showcase how its collection of next-generation edge switching equipment all fits together.

Omniplex Communications in St. Louis has agreed to purchase no fewer than six Lucent products — five for the carrier point of presence (POP) plus an integrated access device (IAD) for the customer premise — to deliver a planned bundle of voice, Internet and application services.

That's a lot of boxes, but Omniplex President Richard Anthony says his unabashed single-vendor strategy will pay dividends in an economical package for end users. Omniplex plans to provide local and long-distance voice, 128K bit/sec Internet access burstable to 768K, unified messaging, a basic Windows 2000/Office 2000 application and bandwidth for third-party application service provider (ASP) offerings — all over a symmetric DSL (SDSL) link to small and midsize offices.

Anthony has calculated the total cost of installing the Lucent architecture to a range of $185 to $400 per port, leading to some attractive end-user pricing options.

By year-end, Omniplex will bring out its Lucent service architecture in St. Louis, Kansas City, Kan., Kansas City, Mo., Rockford, Ill., and Springfield, Ill., with 21 more Midwest cities to follow. The anchor of the network in each market will be Lucent's venerable CBX 500 multiservice ATM switch, but beyond that the network will rely on newer Lucent offerings.

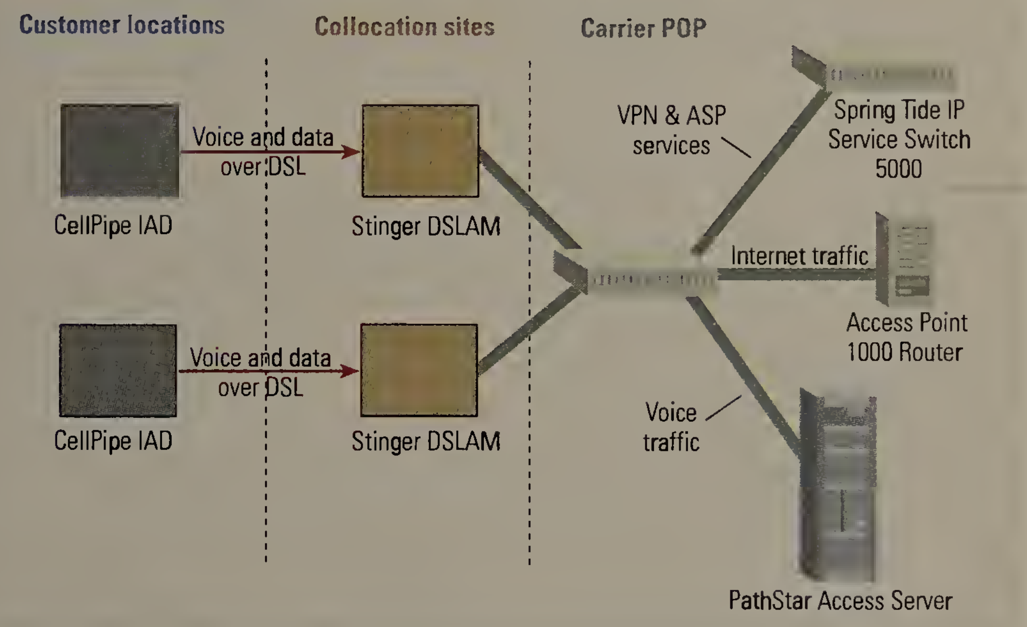
Omniplex will place one of Lucent's new CellPipe IAD at the customer premise. The CellPipe is available in a range of sizes from four to 24 ports and produces ATM cells riding over an SDSL link up to 2.3M bit/sec. In larger configurations it also supports T-1, Ethernet or ATM-25 connections.

At either the Omniplex POP or a collo-

See **Omniplex**, page 32

A single-vendor converged network

Omniplex Communications is counting on six Lucent products to create a next-generation service package.



New forums guide voice/data convergence

New network architectures require new protocols — now!

BY TIM GREENE

A group of new forums is scrambling to hone the development of standards that are needed to bring about converged voice/data carrier networks.

The groups are trying to sort out competing technologies and protocols and come up with accepted technologies that will lead to interoperability among equipment made by different vendors.

Some of these forums are blatantly partisan, such as the Session Initiation Protocol (SIP) Forum, which is pushing SIP over H.323 as the protocol to negotiate voice and video sessions between voice and packet networks.

Others, such as the Open Voice Over Broadband (VoB) Forum, have a tangle of possibilities to sort through, and have stated their technology biases as a way to give their work direction. For instance, the group has chosen ATM over IP as the preferred transport method to link DSL customers' voice and data traffic to carrier networks. It has selected IP, though, as the transport for cable access networks.

Within these parameters, Open VoB also has to sort through a list of signaling protocols that will translate call signals between transport protocols, such as ATM and time-division multiplexing, being used in different segments of carrier nets.

While none of Open VoB's founders is a service provider, some forums seek carrier participation to determine the specifications of the gear carriers want to buy. For instance, the Multiservice Switching Forum (MSF) includes representatives of Qwest Communications, WorldCom, British Telecom and Telecom Italia on its board of directors. "Carriers decide what they will buy and vendors decide what to sell. If we can build what they say they will buy, we will have success," says Avri Doria, chief architect of Nortel Networks' routing architecture, who is also on the MSF board of directors.

MSF's goal is to push for standards that will let equipment makers build carrier switches that handle voice and data and can act as a bridge between traditional voice and data networks and developing IP nets.

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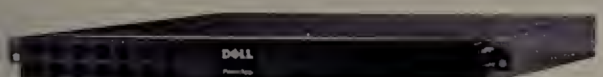

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Telica pitches Plexus IP multiservice switch

BY DAVID ROHDE

MARLBORO, MASS. — A Massachusetts start-up has raised the stakes in the carrier switching arena by unveiling a high-density switch that combines packet telephony and IP VPN data capabilities at a price of $50 per 64K bit/sec equivalent.

Telica, a close partner of leading IP subscriber-management vendor Redback Networks, recently introduced the Plexus 9000. The product is the latest in a series of start-up offerings that purport to boost scalability and flexibility for service providers building native IP networks.

The ultimate goal is to make it easier for corporate network managers to develop remote-access programs that mix and match narrowband and broadband access types while offering the possibility of converged voice and data management.

Telica officials boast that the Plexus 9000 offers service providers a range of configurations, either letting them combine Signaling System 7 signaling with voice and data switching capabilities or to separate the two in a distributed architecture.

They also say the Plexus 9000 is indifferent to users' access methods and can act as a remote-access server for traffic arriving either via dial-up phone service, various flavors of DSL or other broadband access.

Unlike executives at some switching start-ups, Telica officials avoid labeling the Plexus 9000 as a product aimed especially at competitive local exchange carriers. They say the ability to combine three 21-slot shelves into one vertical rack potentially supporting more than 180,000 DS-0 (64K bit/sec) connections makes it equally compelling for incumbent local exchange carriers (ILEC) seeking to evolve their networks.

The scalability stakes

Telica's Plexus 9000 multiservice carrier switch is designed to scale to the needs of incumbent local exchange carriers as well as new entrants. Features include:

- A 21-slot system with 28 T-1s per card.
- An alternative configuration that provides three or six T-3s per card.
- A maximum capacity of more than 60,000 DS-0s per shelf.
- A three-shelf rack provides capacity of more than 180,000 DS-0s.
- A 15G bit/sec backplane results in latency of 1.2 msec.

SOURCE: TELICA, MARLBORO, MASS.

"When we built this product, it was with the ILECs in mind," says Ali Kafel, Telica's vice president of marketing. The Plexus 9000 includes redundant CPU cards and switch fabric, and mimics many of the basic caller ID, 800-dialing and other features enabled in so-called Class 5 switches made for local phone companies by stalwarts such as Lucent and Nortel Networks.

Kafel even shuns the term "Class 5 replacement switch" that others have promoted, saying ILECs want to cap their traditional telephony-switch investments and add new switching models for next-generation services. "We don't use the term 'replacement.' We don't think anybody wants to replace their Class 5 switch," Kafel says.

Telica hasn't announced any of the carriers that are trialing the Plexus 9000. But Kafel notes a key connection with Redback, which has provided some of the $60 million funding for Telica. In a typical application for remote access to an enhanced IP service such as an IP VPN, Kafel says the Telica switch would terminate the access line and connect to Redback's Subscriber Management System, which would perform the authentication and Remote Authentication Dial-In User Service functions.

Kafel concedes that Telica's approach lacks one characteristic of the approach taken by Lucent, whose 7R/E central office packet/circuit switch is an evolution of Lucent's widely installed 5ESS traditional Class 5 telephone company switch and maintains the hundreds of calling features on a 5ESS. The Plexus 9000, by contrast, only provides the most requested calling features. "If you want to do things like three-way conferencing with outbound calling, then you're getting beyond the top 20 features," Kafel says.

Telica: www.telica.com

Omniplex,

continued from page 29

cation site, the ATM cell traffic produced by the CellPipe hits a Lucent Stinger DSL Access Multiplexer (DSLAM), which feeds the traffic to the CBX 500 (see graphic, page 29). From there, voice traffic is split to the PathStar Access Server, an IP telephony server emulating the functions of a local telephone company central office switch.

Data traffic, by contrast, is shipped to Lucent's newest product, the Spring Tide IP Service Switch 5000, a high-density service switch which can establish thousands of simultaneous IP network tunnels.

The Spring Tide box — which Lucent announced in July it is acquiring — can create virtual LANs linking a server at an ASP and clients at end-user locations.

For Omniplex, the commitment to Lucent is part of a strategy to move away from its roots as a voice-oriented telecom reseller. Omniplex began in 1996 reselling local phone lines via independent PBX and key-system installers known as "interconnects." Later it began reselling asymmetric DSL services for Internet access.

Now Omniplex has bought four of those interconnects to obtain a sales force and customer base, and wants to establish its own ATM-based network. After Lucent began acting as an OEM for the Spring Tide service switch — although prior to the July announcement that it would buy the firm — Lucent tested the six-product setup for Omniplex at a lab in Westlake, Calif.

Omniplex hasn't yet installed the Stinger DSLAMs in any collocation sites but plans to do so soon. Anthony notes that Lucent's NetworkCare professional services division is assisting Omniplex with the engineering forms to obtain such space in local telephone company central offices — largely those of SBC Communications and Qwest Communications in Omniplex's planned Illinois-to-Texas service arc. ◪

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The group is anchored by heavyweights in carrier gear manufacturing whose influence will likely sway the direction the industry takes. Cisco, Lucent, Nortel and Siemens are also all represented on the MSF board. They can give direction to the formal standards bodies — such as the Internet Engineering Task Force (IETF) and International Telecommunication Union (ITU) — to approve standards that address the practical demands of carrier networks.

Agreement on standards and interoperability between vendor gear is important to many carriers because they prefer to buy from more than one equipment maker to get better prices and to ensure a steady supply of products.

Less influential vendors than Cisco and Nortel that are involved in these new ad hoc forums may be driven by self-interest as well, but at the same time they are the ones most familiar with the strengths of the new technologies they develop, says Woody Benson, president and CEO of MCK Communications, which makes gear to extend corporate phone networks.

"New technologies are coming from new vendors. They're starting from scratch. The IETF and ITU don't have the same focus. They have lots of legacy technology and lots of subgroups," says Benson, a director of the National Convergence Alliance, a group set up to push combined voice and data networks. ◪

Forums seek new standards

Vendors are cooperating in a new crop of industry forums aimed at accelerating the development of public voice and data networks.

Name	URL	Function
National Convergence Alliance	www.convergence alliance.com	Promotes networks running voice and data on a single network with focus on end users.
International Softswitch Consortium	www.softswitch.org	Promotes standards and applications for platforms that link phone networks with IP networks.
SIP Forum	www.sipforum.org	Promotes the Session Initiation Protocol's ability to set conferencing, telephony and multimedia on the Internet.
Multiservice Switching Forum	www.msforum.org	Works for standard protocols and interfaces between switches in networks that handle voice as well as data.
Open VoB	www.openvob.org	Catalyzes the adoption and deployment of interoperable Voice Over Broadband technologies.

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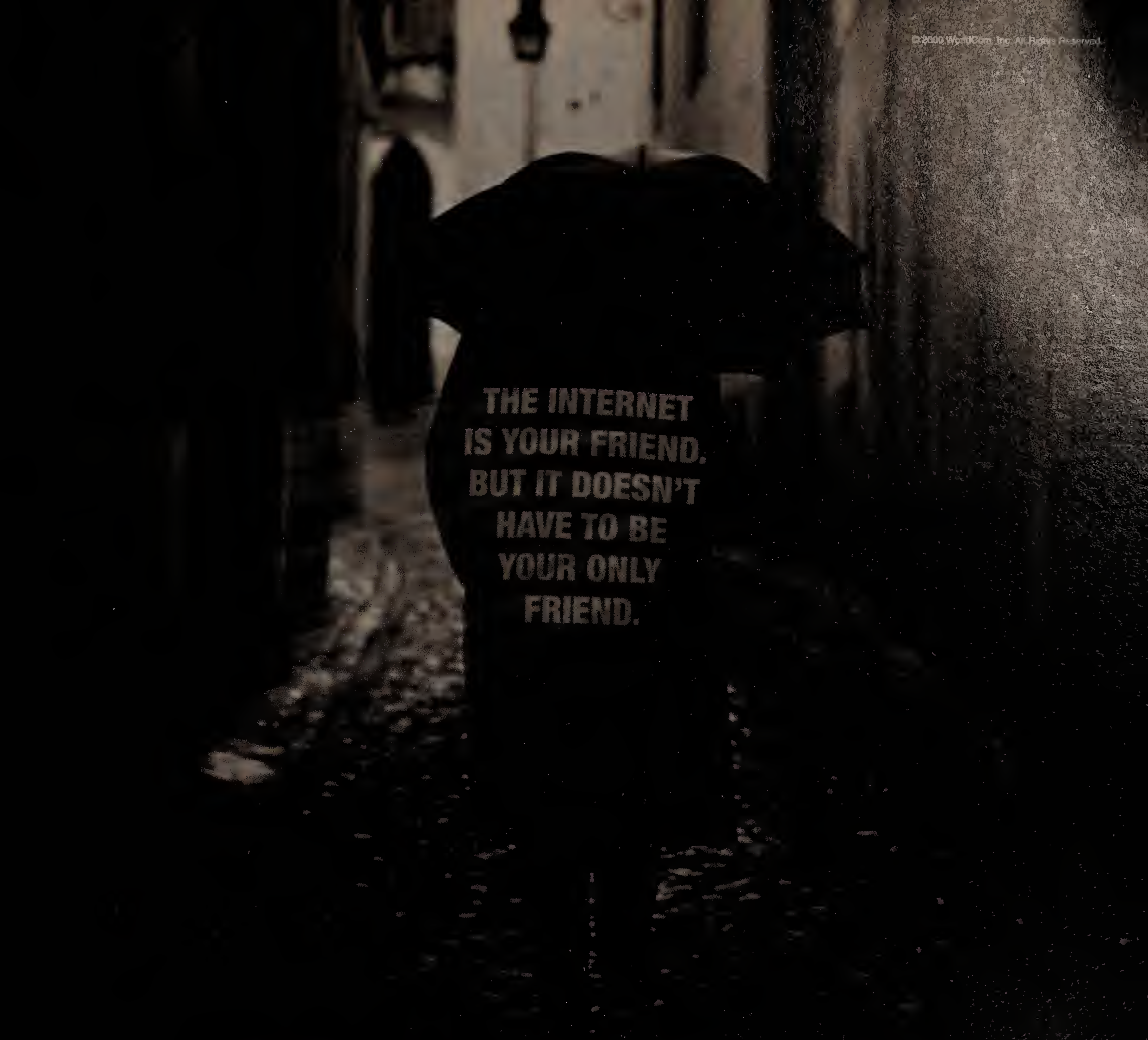

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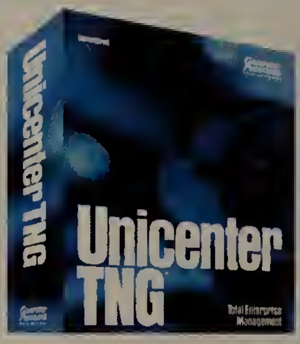

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Briefs

Kinecta last week began shipping two versions of its syndication software and unveiled a companion measurement service for firms that distribute Internet content to hundreds of Web sites. The new Kinecta Interact Enterprise Edition features support for the Secure Sockets Layer standard and is based on a distributed architecture that lets large installations run the software on multiple servers. A typical installation costs between $50,000 and $75,000. Kinecta also released Version 3.1 of its Standard Edition, which supports push technology and offers an easier set-up process. A typical installation costs between $40,000 and $50,000.

Kinecta also announced TrafficRegister, an add-on service for measuring page views and unique visitors. TrafficRegister is sold for a monthly fee based on the number of page views, which typically will be hundreds or thousands of dollars per month.

Kinecta: www.kinecta.com

Trisys, a leading provider of telephone call accounting software, is shipping a new software application today called Insight that lets supervisors monitor PC and Internet usage by local and remote employees. Insight tracks the amount of time end users spend on particular software applications, the number of mouse clicks they perform, the Web sites they visit and the time they spend on Internet pages. The software's goal is to provide an accurate picture of how employees use their corporate PCs while in the office, on the road or at home.

Insight is available as a client/server software application or as an outsourced service. The software sells for $100 per seat, while the outsourced service costs $20 per seat per month and comes with free technical support.

Trisys: www.trisys.com

New strategy taking shape at Informix

BY JOHN COX

The new management team at Informix Software is wrapping up an intensive round of internal meetings in which it is hammering out a new direction for the struggling database company.

Senior Vice President Peter Fiore says the company will lay out those plans soon, but analysts and users are quick to say those plans will have to cover a lot of ground. The challenges include:

- Smoothing the absorption of three major acquisitions during the past 12 months.
- Tightly wedding software from these companies to the Informix database.
- Launching an aggressive marketing campaign to win new business in the booming e-commerce market.
- Persuading an array of third-party software vendors to support the Informix database and the new e-commerce software being built on top of it.

The meetings come in the wake of a drop in revenue and a high-level management shakeup.

After warning Wall Street in early July that earnings would miss analysts' expectations, on July 19 the company reported second-quarter revenue down 4% to $240 million from $250 million for the same quarter last year. Revenue for the first six months were up 2.8% compared with a year ago (see graphic).

The second-quarter stumble cost the CEO his job. On Aug. 9, Informix's board replaced Jean-Yves Dexmier, who served barely a year as CEO, with Peter Gyenes, formerly head of Ardent Software. Ardent, a data integration software vendor, was acquired by Informix last March.

Gyenes at once reorganized five business areas into just two, focusing on databases and "solutions" — packages of Informix software targeted at specific areas such as e-commerce, business intelligence applications, and the like. About 500 people will be laid off as a result of the changes and because of plans to consolidate facilities that the new structure makes redundant, according to Fiore. The company will set aside about $75 million to $80 million in the third quarter to pay for costs associated with these decisions.

For some customers, these events are remote. Kroger Co., the retail chain in

See **Informix**, page 36

Informix stumbles

In the wake of second-quarter earnings, Informix's board of directors appointed a new CEO to shake up senior management and focus the company on the fast-growing e-commerce market. Officials said the database business suffered in the second quarter, but new business related to e-commerce continued to grow significantly, according to Informix.

Q2:	1999	2000
Total revenue	$250,623,000	$240,494,000
Operating income	$24,421,000	$1,678,000
Net income (loss)*	($89,938,000)	$4,929,000

First six months:	1999	2000
Total revenue	$478,154,000	$491,378,000
Operating income	$35,318,000	$28,848,000
Net income (loss)	($82,298,000)	($18,141,000)

*Includes nonrecurring charges

SOURCE: INFORMIX SOFTWARE, MENLO PARK, CALIF

Datria looks to marry mobile phones, databases

TeleForms product speech-enables applications.

BY JOHN FONTANA

DENVER — Datria Systems hopes to become the voice of mobile phone and database integration with its newest speech-recognition software.

The company has begun shipping its VoCarta TeleForms, a voice-enabled system that allows mobile phone users to enter information to and retrieve it from corporate databases using speech.

Datria believes mobile phones can supplant rugged laptops that companies use for collecting data in the field. Observers and end users say Datria software provides dramatic improvements in data-collection accuracy as well as reduced hardware costs and software maintenance.

"Datria has the potential to radically drop the cost per user of these data-collection systems," says J.D. Wilson, an industry analyst for Englewood, Colo., consulting firm SharperInsight. A rugged laptop used in the field can cost $10,000, while a typical mobile phone is $200. Besides hardware costs, Wilson says VoCarta makes it cheaper to maintain applications because they are run from a server and not on individual laptops.

Datria is hoping to voice-enable applications used in the field by mobile workers, such as work order updates, dispatch and crew scheduling, field inventory and asset maintenance. The goal is to replace pen and paper with a much faster and accurate system.

"Instead of sending out two people to collect data by hand, we have a golf cart that is driven down the road by one guy talking into a microphone," says Lynne Center, project engineer for the City of Aurora, Colo. The city, which uses the software as part of street maintenance and tree trimming projects, is able to compress what had been a month's worth of

See **Datria**, page 36

LOOK MA,
NO HANDS

Overview of a Nortel/HP wireless data plan.

See how one start-up is bringing voice access to e-mail.

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'Net Insider . Scott Bradner

OVER SPECIFICATION?

Standards are good things. Standards are good for customers and good for vendors. They are good for customers because they ensure that there are compatible alternative products. They are good for vendors because they can significantly increase the market for a technology. But there can be too much of a good thing.

There has certainly been a problem with some vendors deciding to "embrace and extend" standards, in the words of one, in a way that negates any reasonable standards process, but some of that can be fought in the marketplace. A more systemic problem is that standards organizations have a tendency to produce standards that overspecify, reducing the ability of vendors to develop innovative products that are still interoperable.

A few years ago I, with a bunch of help from Internet Engineering Task Force mailing list discussions, put together an IETF document that tries to give guidance about when to mandate features in standards. This document (RFC 2119, www.ietf.org/rfc/rfc2119.txt) ostensibly defines some key words for use in standards documents, such as MUST, MAY and MUST NOT. But a key part of the request for comment is a paragraph of guidance in the use of the specific terms: "Imperatives of the type defined in this memo must be used with care and sparingly. In particular, they MUST only be used where it is actually required for interoperation or to limit behavior which has potential for causing harm (such as limiting retransmissions). For example, they must not be used to try to impose a particular method on implementers where the method is not required for interoperability."

This guidance came to mind yesterday when I took a look at a new TIA/EIA interim standard on "Performance and Interoperability Requirements for Voice-over-IP Feature Telephones" (www.tiaonline.org/standards/ip/).

This is a well-done document. It does an excellent job of how voice-over-IP phones need to work. It does so for three types of voice-over-IP technologies: the International Telecommunication Union's H.323, the IETF's SIP and megaco/H.248 which is the product of a joint IETF/ITU effort. But I think it goes a little too far.

The document has a table (Table 5.2) that is an overview of telephony features. It has a list of 23 features and subfeatures, each with a requirement level. These range from the "mandatory" ability to originate and accept calls to the "recommended" ability to encrypt calls. I see too many features that are labeled mandatory which are not needed for interoperability. I see no interoperability or harm-avoiding reason to mandate a message-waiting indicator, for example.

To steal from Einstein, standards should be as complete as they need to be and no more complete. Going over the fuzzy line is counterproductive and will ensure less innovate products.

Disclaimer: Harvard, like any good university, ensures that lines are rarely sharp, but the above worry is my own.

Bradner is a consultant with Harvard University's University Information Systems. He can be reached at sob@sobco.com.

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data collection into a week.

Center has yet to explore the real-time connectivity of TeleForms, but is using VoCarta Field, a voice-enabled system to collect data before uploading it into a database.

Now that the city can quickly collect data, it also can do more planning. "We get a pool of money for repair projects from the city. Before VoCarta, we would start at one end of the city and work toward the other end until the money ran out," Center says. "Now, we can analyze the data we collect and hit our high-priority projects first."

Datria acquired the VoCarta speech recognition technology three years ago from Lockheed Martin. VoCarta is a set of tools for building server-based applications that map text into forms. It requires a separate speech engine to convert speech to text.

The tools also can be used to retrofit existing applications and to build in support for global positioning systems that provide location information. TeleForms also generates the vocabulary that is used with an application.

VoCarta runs on Windows NT and supports connections to relational databases or a spatial database, which can print out a map pinpointing where data was collected.

VoCarta TeleForms, which is available now, supports speech engines from Lernout & Hauspie, Microsoft, Nuance and Speechworks. The software is priced from $1,000 to $4,000 per user.

Datria: www.datria.com

Informix,

continued from page 35

Cincinnati, has an Informix database in each of its stores. "We deal with many companies which aren't making their numbers or that have management changes," says Bob Alexander, Kroger's director of data management. "The issue is whether that affects the way they support us." So far, he says, he's satisfied with that support.

> **"I think the core issue here is we did not do so good a job executing our sales strategy."**
>
> Peter Fiore, Senior Vice President, Informix Software

Other customers, especially those building Web commerce sites on the Informix product line, are more concerned. "I'm disappointed in their financial performance," says Eric Weaver, chief technology officer for InteliHealth, in Blue Bell, Pa., and a member of the Informix customer advisory board. "There is some risk [for us] associated with that."

InteliHealth collects health information from various sources and distributes it to consumers and health providers via a Web site, e-mail and printed newsletters. The data, including multimedia video and text, is stored on the Informix database and served through the Web site.

Weaver remains pleased with the Informix product line. "Their technology is solid," he says. InteliHealth just bought the Red Brick data warehouse software that Informix acquired from Red Brick last year.

Informix's Fiore said the second-quarter financials reflected a drop in database sales. But software products aimed at the fast-growing e-commerce market continued "significant" growth, he says.

Informix officials pointed to two trends in the quarterly financials.

"In selling new products to new customers, we were pretty successful," says Fiore, formerly a long-time Ardent executive. "The growth in these segments was pretty significant." About 75% of the revenue in this category is coming from new customers.

The traditional database market is where Informix is floundering, he acknowledged. "I think the core issue here is we did not do so good a job executing our sales strategy," Fiore says. He suggests the Ardent acquisition distracted the former management from the core business.

Informix seems to have the software pieces needed to be successful, according to some analysts. Framingham, Mass., market research firm IDC software analysts Carl Olofson and Henry Morris issued a favorable report on the Ardent acquisition. The Ardent software makes it possible to bring Web data on customer interests and usage patterns into the database from different sources where it can then be analyzed quickly. Then the database can output "relevant, targeted content to immediately impact a customer's Web experience," they wrote.

"If Informix can successfully integrate the Ardent [technologies] into its database systems, then IDC believes it can offer business intelligence server capabilities that will leapfrog the competition," they wrote.

InteliHealth's Weaver likes this approach, which creates a more or less complete package for an enterprise user. "It's very difficult to find talent to build those kinds of solutions," he says. "If you have core transaction processing and data warehouse engines, it makes sense to package and sell software around them."

Informix has to do a better job getting the word out to the marketplace. "They've always struggled with marketing," Weaver says. "I was at an advisory board meeting there in May and they promised more aggressive marketing. I'm still waiting to see that happen."

Gyense and his new lieutenants will have to show Weaver and others like him that the newly hatched corporate strategy can actually pay off.

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Technology Update

An Inside Look at the Technologies and Standards Shaping Your Network

Ask Dr. Intranet

By Steve Blass

We discovered that a person could access our intranet from any PC on our network without logging on to our Windows NT domain. Some feel the physical security of our PCs may not protect us from a visitor to our facilities getting to one of our PCs and then onto our intranet. We are running Windows 95, NT and 2000 clients, and our Web server is Netscape Enterprise Server on Unix. I can think of a few solutions, but none are very appealing: implement Access Control Lists for access to the intranet (this would be a hassle); implement Secure Sockets Layer (I'm not sure this would help); migrate to Internet Information Server 5; insert JavaScript to check for NT logon in each secure page; or prohibit any confidential information on the intranet. Is there anything I can do in my environment to help alleviate this security issue regarding my Web server?

Begin with automatic password-protected screen savers and workstation logons on your intranet PCs to keep visitors from borrowing someone's terminal to get to your Web server. Next, plan to integrate directory services with your security policy and use the Lightweight Directory Access Protocol user authentication capabilities of your Netscape Web server to password-protect sensitive Web pages. Documentation on Netscape Enterprise Server user authentication is available at http://docs. iplanet.com.

Blass is a network architect at Sprint Enterprise Network Services in Houston. He can be reached at dr.intranet@paranet.com.

Storage over IP awaits enhancements

BY BRIAN LARSEN

Enterprisewide storage implies connecting users to storage resources over a WAN. Historically this has been accomplished using relatively expensive dedicated circuits. New developments in storage network technology are enabling transparent storage connectivity over standard IP networks.

Storage over IP should take advantage of an organization's existing or planned IP backbone to move storage data without intersecting LAN traffic. Further, data over IP should provide connectivity and conversion among servers and storage devices, or between storage devices that use drive interface protocols such as SCSI and Fibre Channel. (*Editor's note: A different perspective on storage over IP will be presented in a future Technology Update.*)

A multigigabit switching platform can extend storage networks, including Fibre Channel storage-area networks (SAN), over WANs by integrating channel technology, high-speed network technology, and open systems hardware and software into one platform. This switching platform can operate over a routed, virtual or private IP network.

The switching platform will perform IP encapsulation/decapsulation, which converts data packets to IP packets in preparation for travel over the IP network. Further, it can perform load balancing and create alternate paths over multiple IP interfaces or transport circuits, which provides powerful network management capabilities available on dedicated links, without the cost.

How it's done

Creating a way to move stored data over an IP network requires that a viaduct between the storage resources and the IP network be established. A viaduct is a device that manages connections for data transfer between storage devices, using an IP network for transport. A viaduct will convert data frames to IP packets.

Additionally, a viaduct will convert received IP packets into data frames for remote storage, backup or mirroring.

IP operates at the network layer, Layer 3 of the Open Systems Interconnection stack. The IP layer analyzes the addresses in packet headers and routes packets across subnetworks. The transport layer (Layer 4) ensures reliable transport of packages being sent. Standard TCP was not designed for large-block I/O used in volume data transfers. Therefore, storage over IP, which will typically deal with large amounts of storage data, must be enhanced with built-in transport abilities at Layer 4.

To create a premium class of service that will be suitable for low latency applications such as data mirroring, it is necessary to improve the functionality of Layer 4. This can be accomplished by creating a new transport layer similar to TCP but enhanced for storage that replaces or enhances the TCP layer, making data transmissions faster and more efficient. The viaduct will manage the details of this new layer.

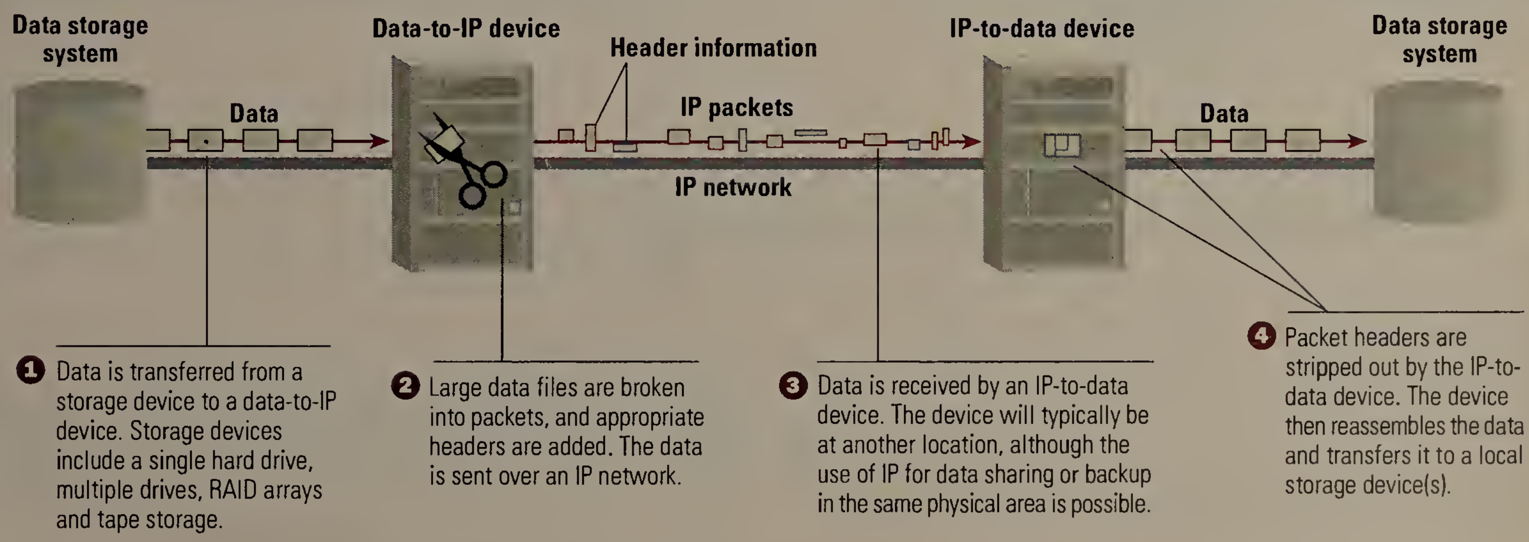
Working within IP presents problems other than lack of interoperability and higher latency. Key technical issues must be solved before storage networking and storage data services can be broadly deployed over private or public IP networks. These issues include quality of sevice, dropped packets, security and network management.

Larsen is director of product management — open systems at Computer Network Technology. He can be reached at brian_larsen@cnt.com.

HOW IT WORKS

Moving stored data

Storage over IP is a way to move large data files across WANs over standard IP networks, rather than over expensive dedicated links.



❶ Data is transferred from a storage device to a data-to-IP device. Storage devices include a single hard drive, multiple drives, RAID arrays and tape storage.

❷ Large data files are broken into packets, and appropriate headers are added. The data is sent over an IP network.

❸ Data is received by an IP-to-data device. The device will typically be at another location, although the use of IP for data sharing or backup in the same physical area is possible.

❹ Packet headers are stripped out by the IP-to-data device. The device then reassembles the data and transfers it to a local storage device(s).

Gearhead . inside the network machine . Mark Gibbs

WHEREVER WE GO, THERE OUR CD-R IS

Gearhead needs lots of storage wherever we go. We find ourselves in all sorts of strange places, with vast acreages of bytes to be stored, found, archived, restored and otherwise managed.

An additional problem is that we have to use many different computers so we need something that can be easily moved from one PC to another.

The answer has been found! Gearhead tested the QPS Que USB Drive from QPS, Inc. of Yorba Linda, Calif., (www.qps-inc.com/) and was very impressed.

The Que USB Drive is a 4-by-4-by-8 CD-Rewritable external drive that comes in a snappy carrying case and works with the Apple iMac and G3/G4 (MacOS 8.0 or higher) and Wintel PCs with Universal Serial Bus support.

The drive offers 1x, 2x and 4x write and rewrite speeds, and supports 8x for reading. The ability to select the speed is important, as some computers can't supply data to the drive fast enough to support 4x or even 2x operation. To make burning CDs more reliable, the Que USB Drive has a 2M-byte buffer.

In case you were wondering, the "1x, 2x" thing refers to the transfer rate of the drive. Originally, CD drives transferred data at 150K byte/sec, but subsequent generations upped the ante. Thus, 2x drives transfer data at 300K byte/sec, 4x drives at 600K byte/sec and so on.

GEARHEAD RATING

9

QPS Que USB Drive,
QPS, Inc.

1=awful, 10=insanely great

The drive also supports Extended Architecture (XA) format, also called "Single/Multi-Session Photo-CD Compatible." This is a recording scheme that interleaves different multimedia content on a single disk. The Kodak Photo CD format is based on the XA spec so all of your happy snap CDs can be browsed with wild abandon.

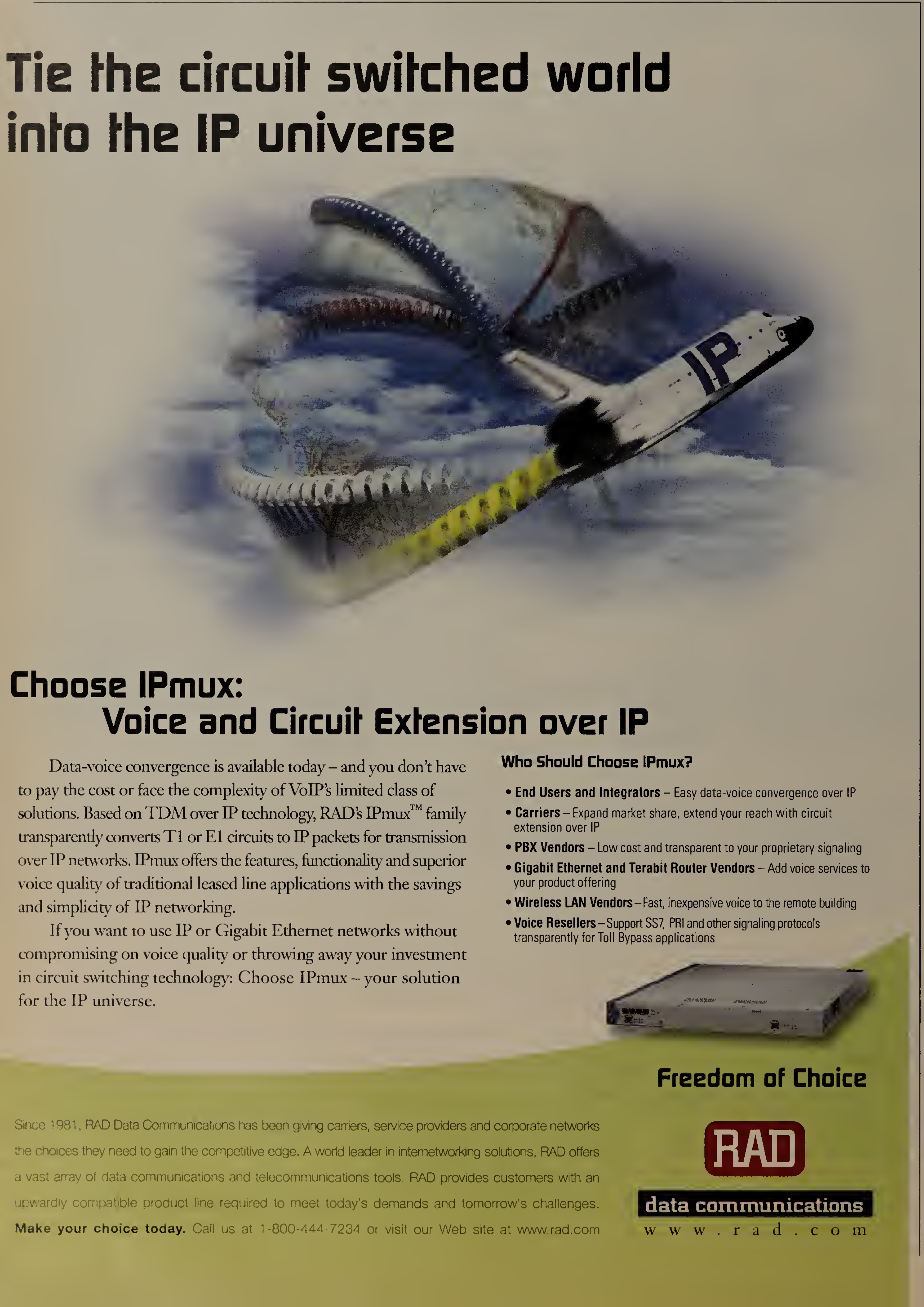
The Que USB Drive reads and writes multiple formats, including High Sierra, ISO 9660 (essentially the same as High Sierra) and audio formats. The drive uses standard recordable and rewritable media with 650M bytes of storage. You can also create audio CDs up to 74 minutes in length for all of those Napster files you downloaded.

The provided software is a breeze to install. That said, Adaptec's DirectCD, a utility that is supposed to let you use a CD-R drive more or less like a regular disk drive, sent Gearhead's PC into a deep sleep several times as the software started, and finally required a reboot (why Windows should allow such a thing is beyond us). We like the idea but the implementation appears to be unworkable.

We really liked the other software — this includes CD Copier, which does . . . guess what? and Easy CD Creator, which lets you assemble a set of files to create either a data or audio CD.

At a street price as low as $230, this is an excellent product that gets nine Gearteeth out of 10.

Read many, write once to Gearhead at gb@gibbs.com.



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Editorial

My banking rant and why customers come first

It isn't hard to find sympathizers when you complain in public about the trials and tribulations of dealing with self-impressed megafirms that forget they are nothing more than organisms designed to serve the needs of customers. Without the latter, the organisms die.

My recent rant in this column about dealing with Fleet Bank after it took over my bank, BankBoston, brought in mail from a boatload of disenfranchised sailors.

Like me, they were upset to see the acquiring bank take BankBoston's elegantly designed and capable computer systems and replace them with hard-to-comprehend and less-capable systems. The ATM interface is hard to navigate, the telebanking system is now frustrating to use and the customer service reps seem to have their hands tied, unable to do even simple chores such as linking accounts.

Apparently, however, I overlooked a few shortcomings in my diatribe. One reader wrote: "I must agree with your editorial on the Fleet ATMs. Not only does it take twice the keystrokes to do the same thing, but they like to alternate the soft keys from one side of the monitor to the other.

"But No. 10 on my top 10 list of 'Where did they hire their programmers from?' is: The first screen after you put in your ATM card is a language selection screen. If you are a Type A person like me and start to enter your PIN number rather than selecting a language, the language defaults to ... Chinese! My guess is it saves the programmer and his friends a keystroke."

He's right. I tried it. It would be funny if it wasn't so pathetic.

Another reader wrote griping about the way Fleet and other large institutions require you to key in your account and password, only to require you to repeat that information again when a human intervenes, and yet again when that person hands you off to still another department. The moral, he writes: "Until companies tie together their departments and records and customer information, 'customer service' will continue to be the bane of many businesses, which is unfortunate since, with products and price roughly equal, customer service makes the difference." I couldn't agree more.

Another moral: The customer comes first. While that's been said before, just maybe we haven't emphasized that enough in the IT inner circle.

— John Dix
Editor in chief
jdix@nww.com

↓ Message Queue

TELLING NO LIES

Howard Anderson's column "Lies, damn lies and marketing lies: Welcome to my world" (www.nwfusion.com, DocFinder: 9723) is hysterical and, unfortunately for a PR person like me, right on the mark. My colleagues and I are still laughing and thinking of framing it and then giving a copy to our clients *before* they start preparing their next PowerPoint presentation.

Amy Neuberger
Senior associate
MWS Agency
Orem, Utah

Howard Anderson's column makes sense from his point of view. But it would be useful to entrepreneurs if he wrote a column giving examples of what really gets funded or is attractive to venture capitalists. Such a column also would help venture capitalists such as Anderson because if entrepreneurs really follow his advice, he will have fewer "liars" lined up at his door.

Krishna Kalale
President
Sentac
San Diego

ARE YOU EXPERIENCED?

I couldn't agree more with Chuck Yoke's column "Certifications do not make a network engineer" (www.nwfusion.com, DocFinder: 9724). I am in the process of obtaining Microsoft Certified Systems Engineer (MCSE) certification. There are many people in my classes who have no business in them; they are attempting to change careers because they have heard stories about all the money they can make. Most of them cannot even maneuver in the Windows environment or tell you what a DOS prompt is.

I have no delusions of grandeur about what I'll be able to do once I receive my certification. I only perceive that I will continue on with other certifications to stay competitive with the industry.

Pauline Dixon
St. Louis

I am working on receiving my MCSE certification. There is no substitute for experience, but few firms are willing to give people like me an opportunity to gain this valuable experience.

I am a novice in terms of experience, but I'm not above working (starting from the bottom, in a learning environment) to achieve my goal. I hope after I pass my exams a company will afford me the chance to prove myself worthy of the paper.

Hylma Blagrove
New York

NORTEL RESPONDS

In his book *The Tipping Point: How Little Things Can Make a Big Difference*, Malcolm Gladwell examines when ideas and innovations graduate from mere notions to sweeping trends. In Nortel Networks' case, the "tipping point" began to build when we started making a series of acquisitions in 1998. Late that year, we acquired Bay Networks. Boom: tipping point!

Although some were puzzled by this move (www.nwfusion.com, DocFinder: 9725), the $6.9 billion acquisition price was a bargain in light of the gains it has brought to Nortel and its customers. We now have:

- The broadest IP portfolio in the industry and are setting the agenda in Open IP.
- Transferred this IP expertise to many products, including the OPTera Packet Solution, the first optical, packet integrated network platform in the industry.
- A major presence in enterprise and carrier IP routing and switching based on Passport, one of the few optical Internet-ready routers on the market.
- Solutions to cost-effectively migrate the trillion-dollar investment in circuit switching to IP, and the capability of adding voice to IP data networks.

Since taking the helm of Nortel 33 months ago, John Roth has re-engineered the company, increasing shareholder value by an astounding $268 billion.

Even Gladwell recognizes the most difficult time to perceive a tipping point is when it is happening around you. Sometimes it takes the lens of history to clearly see the momentous tipping points that together comprise global business history.

F. William Conner
President, eBusiness Solutions
Nortel Networks
Richardson, Texas

E-mail letters to jdix@nww.com or mail them to John Dix, editor in chief, Network World, *118 Turnpike Road, Southborough, MA 01772. Please include phone number and address for verification.*

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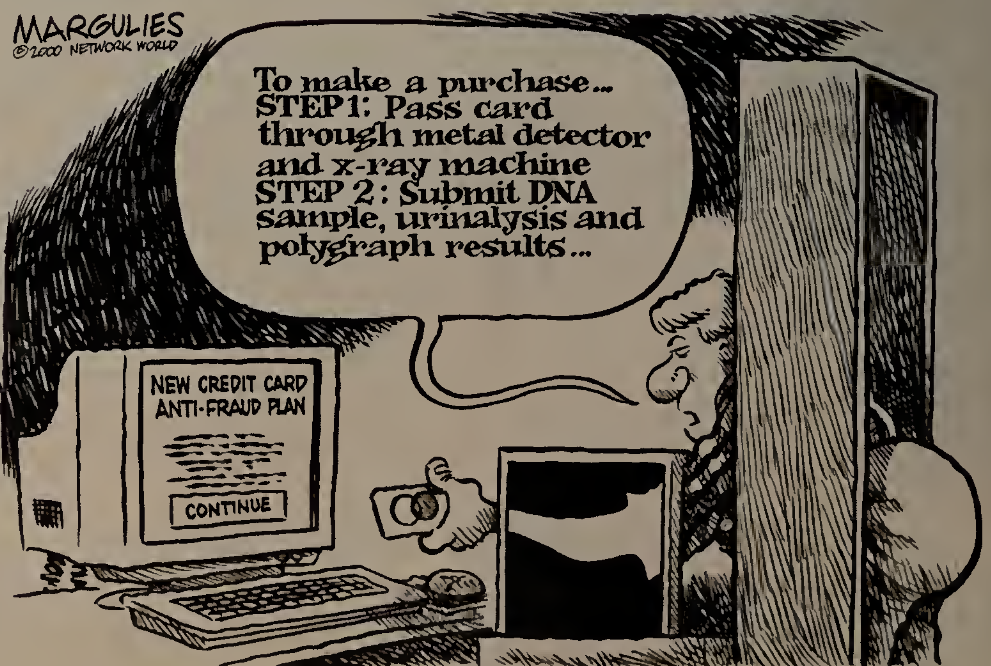
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CONTINUE

Industry Commentary . Frank Dzubeck

XML: THE LINGUA FRANCA FOR B2B 'NET APPLICATIONS

A few years ago, I had to sell clients on the merits of XML. Today, XML has unequivocally become the universal format for structured documents and data on the Web.

Software vendors are slowly embracing XML. IBM was an early adopter and even became an evangelist. Cisco has completely opened its policy management software with XML. Sun intends to include a native XML parser within Java 2 Enterprise Edition and even offers a transformation compiler that converts XML scripts into Java code. XML is synonymous with portable data, as Java is synonymous with portable code: both are essential ingredients to next-generation Web-based applications. Microsoft, with the announcement of .Net, has made a significant commitment to XML.

Beyond the software industry, the business community has embraced XML as the salvation for business-to-business e-commerce Web sites. On www.xml.org, a registry of XML schemas sponsored by the Organization for the Advancement of Structured Information Standards, there are more than 150 XML schemas in 45 industry categories. These schemas will let different business applications exchange data and documents using a common construct and language.

XML is popular because it is license-free, platform-independent and a well-supported standard. It's also the right technology for the right time. The development of XML began in 1996, almost two years before it became a World Wide Web Consortium standard. XML was plagiarized from Standard Generalized Markup Language (SGML), developed and standardized in the 1980s for large document communication; and HTML, developed and standardized in the 1990s and widely used on the Web today. XML is the best of SGML combined with the knowledge gained from HTML usage. XML is less powerful than SGML but has better construct and is easier to use.

We have reached another milestone in the transformation of the computer and communications industry. Using the Open Systems Interconnection model as a reference, IP established a level playing field for developer and user interoperability at Layer 3. TCP/UDP [User Datagram Protocol] did the same at Layer 4, and now XML addresses interoperability at Layer 7. The significance of this event cannot be understated. The power of the Internet was always presumed to be IP and TCP/UDP, but these protocols are only the "plumbing" standards to let applications interact and communicate.

XML and associated schema standards are the basis for the next generation of Web application development and productive usage. Eventually, XML will replace specialized standard communication application protocols such as SNMP and Wireless Application Protocol; application development protocols from vendors such as Microsoft, Sun and IBM; and proprietary application protocols from companies such as SAP, Oracle and PeopleSoft. Finally, XML will replace proprietary internal corporate application protocols in segments such as the finance, insurance and pharmaceutical industries.

XML will become the lingua franca of the application world, letting true business-to-business application interoperability finally occur and thereby driving Web usage and business productivity to ever-increasing heights.

Dzubeck is president of Communications Network Architects, an industry analysis firm in Washington, D.C.

Speaking the LANguage . Linda Musthaler

PEER-TO- NETWORKING MAKES A COMEBACK

A few years ago, my colleagues and I wrote a book on peer-to-peer networking with Windows for Workgroups. It appears now that we were ahead of our time, at least on the concept of peer-to-peer networking. After a few years of refinement, peer-to-peer is making a comeback in a big way.

Five or 10 years ago, the main reason to establish a peer-to-peer network — usually within a small office or workgroup — was to share files or scarce resources, such as printers and scanners. Today, the scope of peer-to-peer networking is broader, often on a global scale.

If you can't imagine a global network that eschews a server as the central hub, letting thousands if not millions of PCs communicate directly, then pick up a newspaper and read about Napster. Despite the legal issues Napster raised about content and copyright, the company's 21 million users have proven the theory that peer-to-peer computing is valid. Indeed, the peer-to-peer platform is emerging as one of the most powerful platforms on the Internet.

Convinced that they've got the concept right (if not the content), early founders and investors of Napster have formed a new firm, AppleSoup (www.applesoup.com), that is again based on distributing digital information via a peer-to-peer network. The difference is that AppleSoup is protecting the content owners' rights to their intellectual property by assigning rights management rules and procedures. These technical advances permit content owners to distribute and sell their property as information moves directly from one hard drive to another over the Internet.

Peer-to-peer technology like this has huge implications for the Internet, although it may still be too early to tell just what the ramifications might be. Even eBay CEO Meg Whitman recently revealed that she's got a technical team with its eyes trained on peer-to-peer networking. EBay has built a solid business on letting customers trade things via its centralized marketplace. Imagine what would happen if people didn't need eBay as the middleman anymore.

But selling and trading things isn't the only use for Internet-enabled peer-to-peer networking. A few organizations have used the strategy to create what amounts to a massively scalable, distributed, virtual supercomputer. Take, for example, the Search for Extraterrestrial Intelligence (SETI) at Home Project at the University of California at Berkeley (http://setiathome.berkeley.edu).

The project's mission is to process radio transmissions received from the Arecibo radio telescope in Puerto Rico for signs of extraterrestrial life. To achieve this goal, volunteers download an application file that uses their computers to process small chunks of data. Every few days, the program downloads data from the telescope, and while a computer is not in use by the user, it processes the data for patterns. Upon completion of a package of data, the computer returns the results of the analysis to the server.

With more than two million registered volunteers downloading and processing the data, the SETI project has been considered the fastest computer in the world. The project has already performed the largest cumulative computation to date.

If the Atlanta start-up AgentWare (www.agentware.net) has its way, this new form of peer-to-peer computing won't be strictly for consumers or home users. In July, AgentWare released a business-to-business development platform that will let e-businesses manage Web sites, portals and e-commerce without the traditional dependencies on costly infrastructure and labor.

AgentWare's technology enables custom delivery of content, transactions, media and services from multiple sources on the Internet to any device connected to the Internet, including PCs, appliances, cell phones and pagers. AgentWare calls its model "point-to-point" computing, as users can bypass traditional central servers and connect directly with content providers' sites.

Lest you think this "new" computing model is only for start-ups, think again. Intel recently entered the scene with a few announcements during its recent developers forum.

Pat Gelsinger, vice president and chief technology officer of the Intel Architecture Group, likened the potential impact of this technology to the effect Web browsers had to the initial development of the Internet.

Gelsinger foresees a day when client computers in a corporate network are used as a collective resource for the company, not unlike the SETI project.

To further refine the implementation of the peer-to-peer design in the corporation, Intel is helping to establish a Peer to Peer Working Group, where member companies can address issues such as standards and security.

There's no doubt we're in the nascent stages of peer-to-peer networking via the Internet. First we'll see "renegade" implementations take root, but soon we'll see practical implementations for the corporate and business-to-business arenas.

Musthaler is vice president of Currid & Company, a technology assessment and consulting firm in Houston. She can be reached at linda@currid.com.

When Layer 3 switches burst on the scene, industry pundits began predicting the demise of the slower, more costly router as a mainstay of enterprise networks. Has that happened? Not exactly.

BY JIM DUFFY

True, Layer 3 switches are elbowing routers out of the core of enterprise nets for applications such as LAN segmentation and subnetting. In fact, the total market for modular and fixed Layer 3 switches has skyrocketed from a paltry $34.7 million in 1997 to more than $2 billion last year, according to Dell'Oro Group in Portola Valley, Calif.

But WAN access and aggregation, multiprotocol support and voice/data integration are keeping — and will continue to keep — routers around for a long time in enterprise networks.

And the market numbers bear that out. Sales of high-end, data-only routers aren't exactly declining or even flattening out. In fact, sales were up 43% in 1999, from $1.6 billion the previous year to $2.3 billion, according to Dell'Oro.

The market for midrange voice and data routers, meanwhile, grew a healthy 60%, from $872 million in 1998 to $1.4 billion in 1999, Dell'Oro states. This is due to small and midsize companies looking to reduce monthly telephone charges by combining voice with data on the router network.

"What's often happened is that people that used to have a collapsed backbone routing configuration have replaced that with a Layer 3 switch," says Dave Passmore, research director at The Burton Group in Sterling, Va.

He adds, "But because Layer 3 switches have traditionally not supported WAN interfaces, they've repurposed [routers] and made them the WAN router. The router is no longer handling LAN-to-LAN traffic. That's being handled by the Layer 3 switch."

The Internet is also driving sales of high-end routers because service providers need more and more IP routers to accommodate traffic growth. Similar to what's happening with LANs, legacy routers are not going into the core of the 'Net, but around the edge, aggregating traffic from access points, tagging it with VPN identifiers and feeding it into a new class of gigabit-speed routers performing many routing functions in hardware.

Cisco rules the router market

When it comes to high-end legacy routers, Cisco is the dominant player, with 88.1% market share — the only competitor of any consequence is Nortel, at 11.2% — so Cisco's product road map pretty much determines how routers and switches will be used.

Investment giant Merrill Lynch is an example of a large corporation redeploying traditional Cisco 7X00-class routers as WAN aggregation devices. Last year, when Cisco introduced its Catalyst 6500 LAN routing switch — which is what many would call a Layer 3 switch — it changed the game for the 7X00 router, as far as Merrill Lynch was concerned.

Merrill Lynch's network serves 68,000 employees in 950 global branches. The network spans five continents, goes from 56K bit/sec dial-up and T-1 frame relay access connections to E-1 and DS-3 backbone links and consists of 1,800 to 2,000 Cisco routers, 45% of which are Cisco 7X00-class high-end devices.

"We've made a big investment in these 7500 series routers, but we don't think they're a strategic investment — that's why we're not buying more of them," says Nicholas DeVito, director of technology infrastructure services at Merrill Lynch. "We're pushing them more out to the WAN, and we're replacing them as LAN routers with something like the 6500 series. We can deploy far more port densities in terms of high-speed Ethernet — 100M bit/sec with Gigabit backbones" with the 6500s, he says.

If Merrill Lynch needs to buy more WAN routers for new sites, the company is inclined to go with Cisco 12000 Gigabit Switch Routers, which scale from 40G to 80G bit/sec and are targeted predominantly at service providers.

Even so, there are some pretty solid reasons why the 7X00 series routers will continue to have a place in the networks of Merrill Lynch and other enterprises.

For example, the 7500 is the only router or switch that supports Cisco Channel Interface Processor, a card that attaches to an IBM mainframe and connects legacy IBM SNA networks to IP networks without the need for an SNA front-end processor (FEP).

Merrill Lynch is looking to replace about 100 of those IBM FEPs with channel interface processor (CIP)-enabled 7500s. That may require the firm to continue purchasing 7500s, even if not for WAN routing, DeVito says.

"The 7500s are working well for that particular function, and given the data center mind-set, they like going with stuff that works," he says. "Over time, I'm sure we'll replace them, but in the short run, we're happy with the way they're performing. So we might buy a few more 7500s with CIP cards just for that very purpose. But by no means or stretch of the imagination do we see that as a major or significant investment; it's just pockets here and there where we need to supplement for performance or capacity."

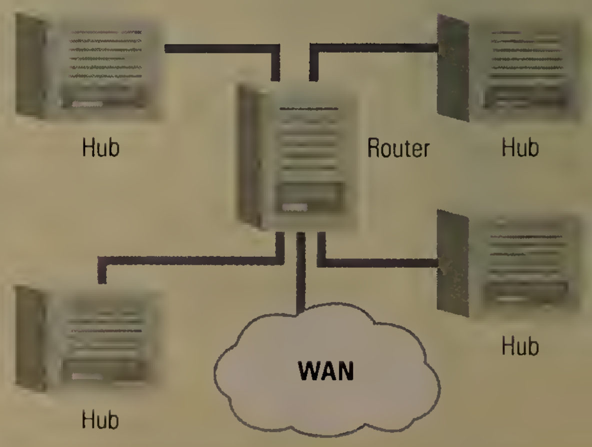
Multiprotocol support

Another key feature of routers that keeps them around is the ability to route multiple pro-

RE-ROUTI

Pushed to the Edge

Before Layer 3 switches, routers ruled the LAN.



THE ROUTER

tocols. Layer 3 switches usually support only IP, or IP and IPX, and do not include most of the software feature sets included in high-end routers.

"If you weren't running AppleTalk, you wouldn't need routers," says James Wiedel, director of networking at the University of Southern California (USC) at Los Angeles. "And if you weren't going anywhere, you wouldn't need a router at all with the Layer 3 switches."

Two years ago, USC replaced some old Cisco AGS+ routers with Layer 3 SmartSwitches from Cabletron. USC uses Cisco 7500s to route packets between networks and handle legacy, or non-IP, traffic. In all, USC has replaced seven AGS+ routers with SmartSwitches and two 7500s.

"The 7500s are doing WAN aggregation and routing random protocols, all the non-IP stuff," Wiedel says. "Our Layer 3 stuff cuts through the VLAN so that need not even touch the routers, unless you're leaving a domain and going somewhere else. We're using [routers] on the wide-area links because they do a little better job of not passing lots of traffic over the slow WAN links."

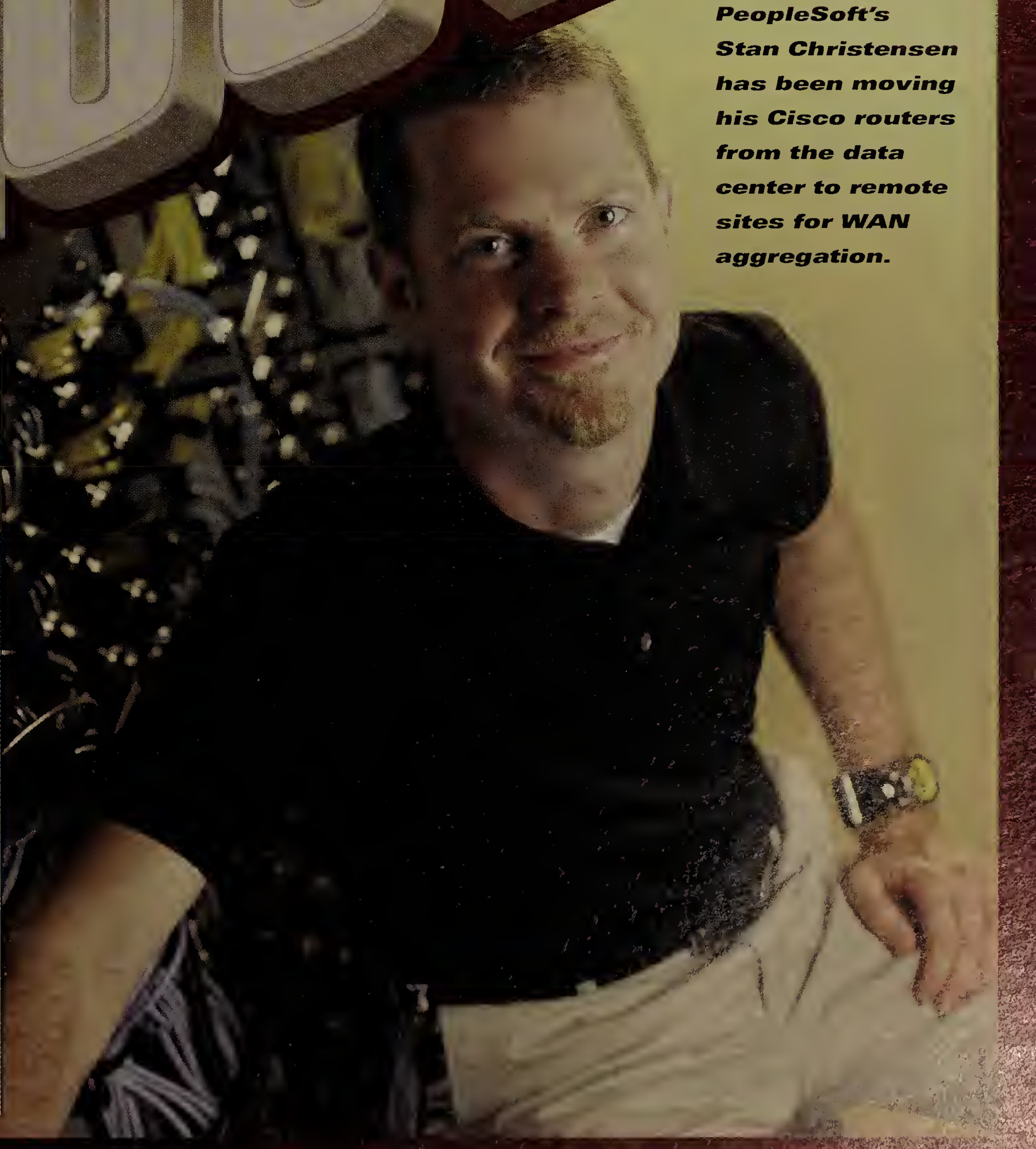
Wiedel says USC hasn't increased the port count of its 7500s "in years" even though the school's network has grown significantly. The network growth is being handled by Cabletron SmartSwitch 6000s with the company's SecureFast cut-through switching technology. In all, USC has about 30,000 switch ports, mostly 100M bit/sec and 1G bit/sec Ethernet.

"Right now, SecureFast has some real wins in it for us," Wiedel says. "It does a lot of the routing and it takes the load off of routers. That's not true of most other manufacturer's stuff that's running IEEE 802.1p and Q [frame-tagging protocols]. They require a router to get in between the VLANs."

But even SecureFast cannot block out all of the broadcast traffic a flat, Layer 2 network is known for.

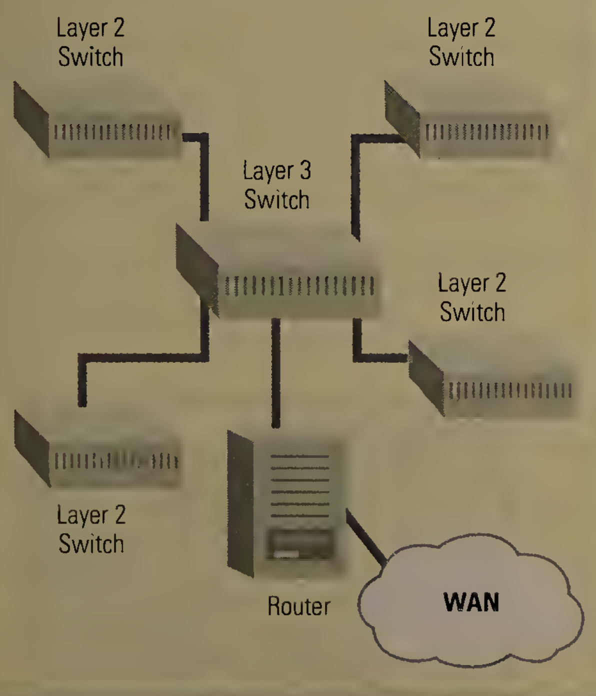
"There would be a lot of broadcast traffic that would carry over the WAN links that you really don't want out there," Wiedel says. "You still need the routers to shut up a lot of the noise."

Wiedel envisions keeping USC's two 7500s around for the short term. Longer term, though, they'll be replaced, he says "At some point in time, they'll swap out for something else, but I



PeopleSoft's Stan Christensen has been moving his Cisco routers from the data center to remote sites for WAN aggregation.

Today, Layer 3 switches are replacing routers in the core of the LAN, while routers are providing WAN access.



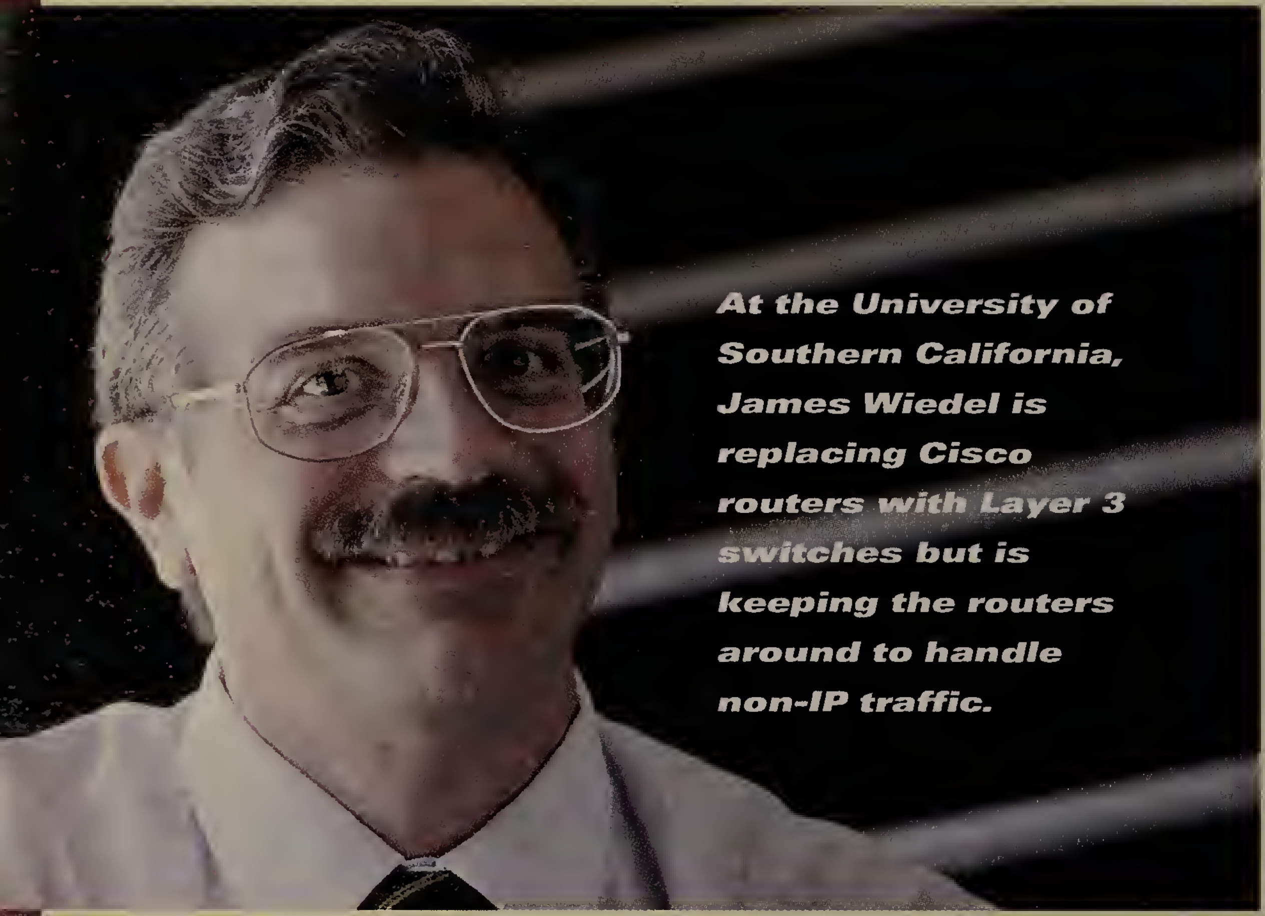
don't know what that something else is."

Software giant PeopleSoft has an idea what that something is: Cisco's Catalyst 6500 routing switch with FlexWAN adapters.

FlexWAN debuted earlier this year as a way to "WAN-enable" the 6500 so it could serve as a single routing and switching platform to consolidate LAN, metropolitan-area network (MAN) and WAN services. By doing this, users can lower their cost of equipment ownership, simplify network design, ease network management, and migrate existing MAN and WAN networks, such as those based on routers.

To foster the migration, FlexWAN even uses the same T-1, T-3, ATM and packet-over-SONET WAN port adapters as the 7500 and Cisco 7200 routers. This seems like a simple, straightforward replacement for those traditional routers, which one would assume might now be ripe for retirement.

But Cisco stresses that the 7500 can still be used as a high-density enterprise WAN edge device with a "sweet spot" in T-1/T-3 aggregation. The box can also function as a virtual private network gateway and supports IBM SNA connectivity through the CIP. Cisco even added voice to the 7500 platform earlier this year via a new Multiservice Exchange chassis that supports a circuit-switched bus.



At the University of Southern California, James Wiedel is replacing Cisco routers with Layer 3 switches but is keeping the routers around to handle non-IP traffic.

BRUCE HERSHEY

But PeopleSoft's routers don't need to be heard; they need to be pumped up.

"We keep getting into oversubscription problems," says Stan Christensen, director of network engineering at the Pleasanton, Calif., software company. "We've got a lot of packet-over-SONET [interfaces] connecting a lot of the metropolitan-area networks together on those units as well. So we've had to keep adding multiples of 7500s just to keep them from oversubscribing too much."

PeopleSoft has been testing the 6500 with FlexWAN modules. With the 6500/FlexWAN combo, PeopleSoft can stuff as many packet-over-SONET modules as needed without oversubscribing the switch.

"We're going to put it into testing and then production to see how it flies," Christensen says of the 6500/ FlexWAN combination. "If they do it right, it could easily replace the 7500. I don't see any reason why it couldn't. For us, it could pretty much replace everything we use the 7500 for."

Well, nearly everything. PeopleSoft is moving the 7500s out of the data center environment — where big bandwidth lives — and into remote sites for T-3 and E-3 aggregation.

"We've rolled more than half of our 7500s now into all of our major hub sites as we've been clearing them out of here," Christensen says. "They're not useless; they're just not good in a data center environment."

But the routing future, as PeopleSoft sees it, is clearly with the 6500/ FlexWAN combo.

"Since we've been going in these other directions of 6500s, we haven't needed to buy really much in the way of new 7500 product," Christensen says. "We're still cruising on the products we've had for the last year or so."

WAN aggregation

So is Union Pacific Railroad in Omaha. Union Pacific is an old Wellfleet/Bay Networks shop with a router network composed of some 32 Backbone Concentrator Node (BCN) devices.

Union Pacific is not buying any more BCNs — and has not for years — because the company's long-term LAN routing strategy is to go to Layer 3 switching. But BCNs still handle a lot of the company's LAN segmentation chores because a migration project in a company the size of Union Pacific takes years.

And like other users, Union Pacific is pushing BCNs out toward the edge of its network for WAN aggregation duty.

"At the main locations, over half the users are still behind BCNs," says Brett Frankenberger, systems engineer at Union Pacific. "We were mostly token-ring. So it's not just a case where you can pull out the router and put in a core Layer 3 switch when you have to touch all of the end users. We have projects going on to do that, but there are probably 10,000 nodes at the main locations that would have to be touched. So it's not a one-year project."

Union Pacific is moving a lot of its servers off of BCNs to Fast Ethernet switches because "it's easier to touch them," Frankenberger says. Those servers are then linked to BCNs via Fast or Gigabit Ethernet.

The company's end users are still on 16M bit/sec token ring with an average of 50 to 100 users on a ring. The performance of these networks, interconnected through a BCN, has been "OK," Frankenberger reports.

Union Pacific's St. Louis operations are farthest along in the router-to-switch migration, Frankenberger says.

"There was a major PC replacement project in St. Louis, which is what drove that this year, because we're going to be touching all of the desks anyway," he says. "We plan to redeploy the BCNs. The project in St. Louis is only going to get rid of half the BCNs there. There were four in the city in various buildings, and now there's still going to be two afterward to support the rest of the users. And there's a lot of WAN access hubbed out of St. Louis also. So we need that still."

About one-third of Union Pacific's BCNs are in Omaha and St. Louis. The rest of them are at major field locations. And right now there are no plans to migrate those field locations to Ethernet switching.

"They'll stay on the routers," Frankenberger says. "They generally have ATM links out of there, and the aggregate bandwidth leaving one of those locations is less than token ring anyway, so there's not a whole lot to improve."

WAN ports on high-end routers have increased from 55% of the ports shipped in 1998 to 60% in 1999, The Dell'Oro Group reports. The market tracker forecasts that WAN ports will comprise more than 75% of the ports shipped on high-end routers this year.

Delivering voice/data routing

Dell'Oro predicts that more PBX and software-based voice functionality will be added to routers over time, which will trigger additional router sales.

As Domino's Pizza in Ann Arbor, Mich., looks to meld voice with its data infrastructure, its investment in Nortel's Access Node Hub (ANH) remote site routers could be capped as the company sizes up Nortel's Enterprise Edge product. The ANHs connect 32 remote sites to Domino's headquarters over 56K bit/sec and T-1 frame relay links.

Enterprise Edge combines digital telephony, IP routing and a LAN hub or switch all into one system.

"That looks like a pretty good solution for us," says Matt Maguire, Domino's director of IT. "It would be [a replacement for the ANHs] if we turned up a new office from scratch, but there's no reason to upgrade those unless their phone system is failing. We're looking at it possibly for our stores as a low-end solution."

Enterprise Edge could replace both the ANH router and Nortel's Norstar key system at a remote site, Maguire says. Domino's is also evaluating a competitive offering from Vertical Networks. "They essentially have a Cisco router baked in it," Maguire says.

Down, but not out

So the role of the router is clearly changing.

Traditional, CPU-based, software-intensive routers, like the Cisco 7500 and the Wellfleet/Bay/Nortel BCN, may be a dying breed, but their function is still critical. Those functions will just be subsumed by a new generation of higher-speed, hardware-intensive routers that, for all intents and purposes, could be marketed as a switch.

"Traditional routers will, over time, be enhanced with their own ASICs and the like," says Eric Hindin, formerly an analyst at The Yankee Group in Boston. "I think they have plenty of life. If nothing else, there are so many of them out there, you and I will have long since moved on by the time there's no role for them in carrier and enterprise networks." ◪

The Edge

For more Edge-related information, go to www.nwfusion.com/edge.

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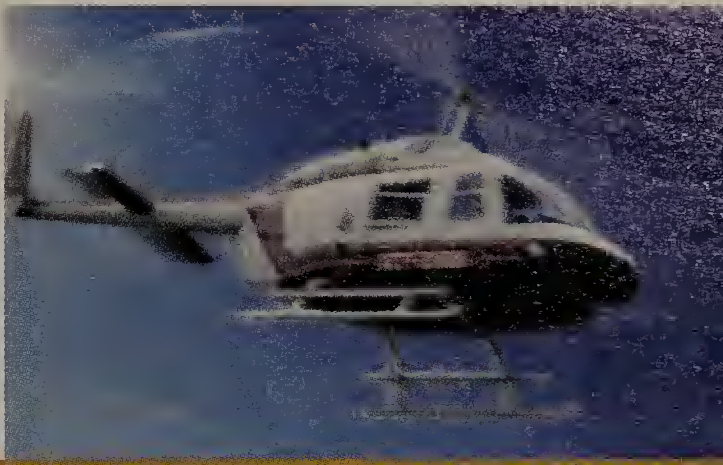

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ROUTER COMMANDS

Here are a dozen indispensable commands you need to know for troubleshooting Cisco routers.

BY LAURA CHAPPELL

Have you ever been troubleshooting a Cisco router when your mind went blank and you forgot a crucial command?

There are certainly plenty of them to remember, so we've assembled a refresher list of the key commands you'll type most often.

As you probably know, the primary means of configuring and managing Cisco devices is through the Internetwork Operating System's command-line interface. The environment is more efficient than a graphical user interface because it doesn't require as much memory or processing power, but it also provides a steeper learning curve for new users.

Whether you're just starting out with Cisco equipment or you're a veteran user who occasionally loses your train of thought, this handy guide to essential Cisco troubleshooting commands should help you get the job done quicker.

Chappell is a senior protocol analyst with Protocol Analysis Institute, a network analysis, research and training firm in Saratoga, Calif. She can be reached at lchappell@packet-level.com.

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show interfaces

This command displays a wealth of information about the interfaces of the device — some of which is common to all interfaces and some of which is specific to the type of interface. For example, you can learn the status of the interface, status of the line protocol, hardware address, IP address, frame type and packet rates (including error counters).

"One time, one of our core routers had become inoperable because it was getting pounded by an enormous amount of traffic and had been brought to it knees. By using the 'show interface' command, I was able to see that the traffic was coming in on the ATM interface on which we were using [LAN Emulation]," says Edward Johnson, information services engineer with Capital One in Glen Ellen, Va. He discovered that his router was unable to handle this tremendous number of packets in its input buffer.

Note that in Cisco IOS Release 12.0(1)T or later, you can filter the output from the show command using the following syntax:

Show | {begin | include | exclude} | *regular-expression*

For example, the command "show interface | include protocol" will output only lines where the word "protocol" appears.

show ip route

Shows all static or dynamic IP routes as well as directly connected networks and the default gateway.

debug ip routing (and other related debug commands)

Real-time status messages defining current routing processes and updates. "This command allows me to watch the routing table updates to see if conflicting routes are being processed," says Ken Diliberto, a network system specialist with the city of Fresno, Calif. However, note that the debug commands consume significant CPU cycles on the router. Don't execute the debug commands on a heavily congested network. Know "undebug all," which turns off all debugging on the router.

show version

Displays the IOS version information, uptime, configuration of system hardware, reason for last boot, source of configuration files and boot images.

show arp

Displays the entries in the ARP table. "I'm constantly chasing down specific workstations or servers to find where a device is plugged into the network," says Chloris J. Cheng, technical analyst for Effem Services, a division of M&M Mars in Mount Olive, N.J. " 'Show arp' allows me to find the [media access control] address of a device via its IP address. I then use the MAC address against the 'show cam' command on a switch, and voila! A port location is revealed."

show tech-support

Strings together the results of several useful troubleshooting commands, including show buffers, show controllers, show interfaces, show running-config, show processes cpu, show processes memory, show stacks and show version.

show processes

Displays CPU utilization for the last 5 seconds and its routing update process timers, route entry hold-down timers, incoming and outgoing filter lists, metrics/distances, learned routes and routing neighbor list. This command is used to isolate routing problems caused by incorrect information.

show cdp neighbors

Shows active neighbors using the Cisco Discovery Protocol (CDP). "I frequently find myself using 'show cdp neighbor' commands to get familiar with what is attached to the device. Having a good mental picture of what the device does and what other areas it serves is one of the first tools I reach for in my troubleshooting bag of goodies," says Scott Gund, a network engineer with San Diego Data Processing Corp.

ping (extended) and traceroute

Performs simple through complex connectivity tests and route path exploration. (See www.nwfusion.com, DocFinder: 6323 for more details about these commands.)

show ip interface

Displays myriad details regarding the usability status of interfaces configured for IP, including the maximum transmission unit, helper address setting, directed broadcast forwarding, multicast groups joined, inbound/outbound access lists, proxy address resolution protocol setting, security level and Internet control message protocol mask replies.

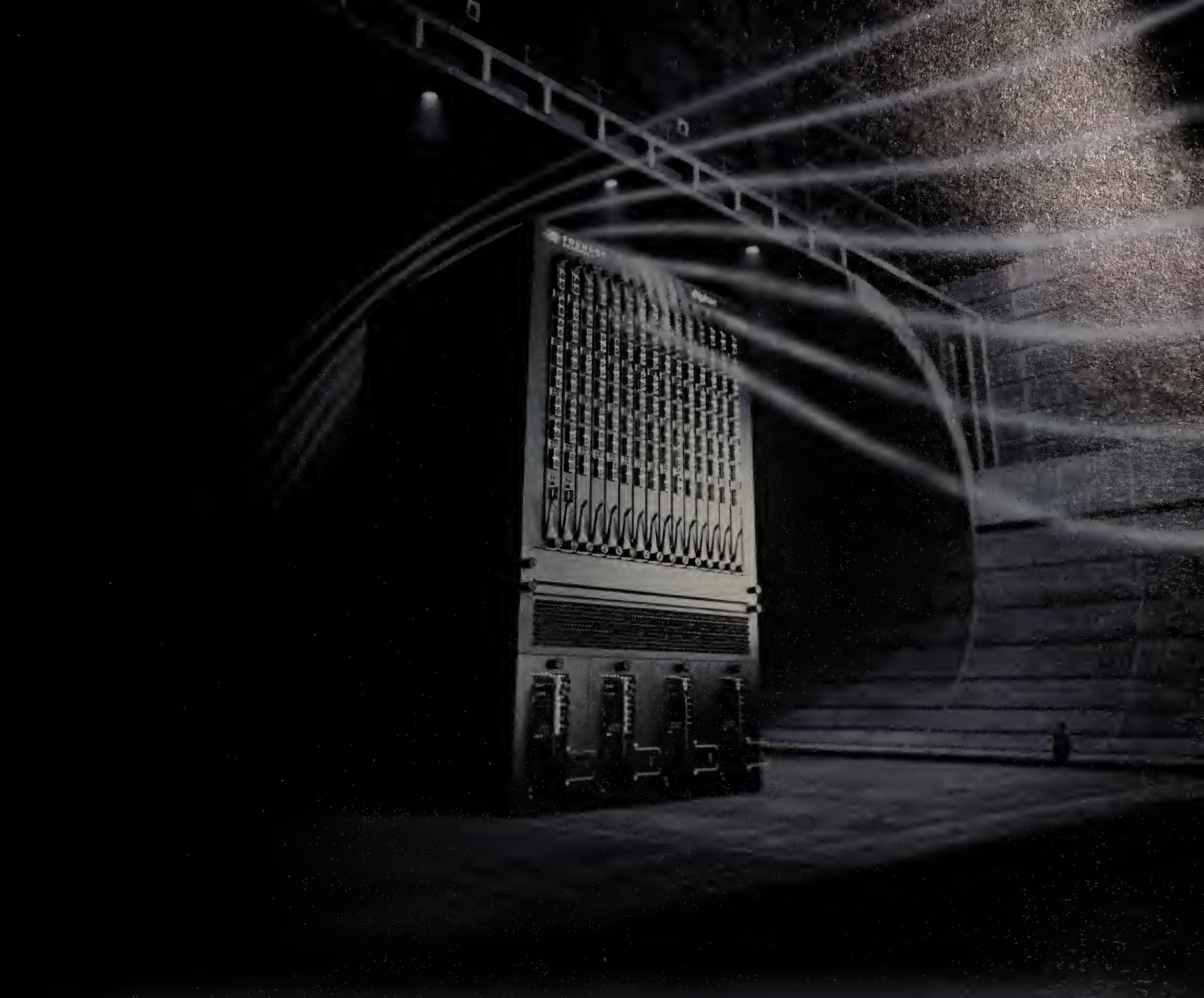
The command "show ip interface brief" provides a quick summary of IP status and configuration.

show logging

Displays the state of syslog error and event logging, and SNMP configuration parameters and protocol activity. The command "show logging summary" charts the error messages and notification messages associated with each card in the device.

show running-config

Displays the current running configuration of the device. "This is the absolute starting point. You must know how the router is configured before you start troubleshooting," says Kevin Beaver, a partner at iSpeed Solutions in Roswell, Ga.



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FACE-OFF

Should building owners be required to allow all carriers access to their sites?

Advocates say the FCC must force landlords to provide carrier choice; opponents say choice is already available.

YES BY JOHN WINDHAUSEN

I have a friend who recently moved his growing business out of his basement and into an office building. All of his communications needs — local phone service, long-distance service, Internet access and e-mail — are now handled by different companies. He didn't have a choice in the matter.

It wasn't supposed to be this way. The Telecommunications Act of 1996 was designed to let consumers choose from an array of telecom providers. Congress determined that multiple providers would offer customers better, faster and cheaper services. In the four years since enactment, more than 300 new companies have entered the telecom market, investing over $30 billion in new networks. Residential rates for high-speed Internet access declined 27% between 1996 and 1999. As competition intensifies, prices will drop even further.

But not for tenants. This segment of the population is still being denied the benefits of competition. One-third of Americans live in apartment buildings, and most small and midsize businesses are located in America's 760,000 commercial buildings. Unfortunately, only 5% of commercial tenants, and a negligible percentage of residential tenants, have access to competitive telecom services.

Why? Some building owners do not recognize that it is technologically possible for several carriers to serve a building. Others simply do not regard competitive telecom services as a high priority. And the building owners have little incentive to negotiate quickly because: a) the tenants already receive service from the incumbent local telephone company, and b) commercial tenants are often locked into long-term leases.

Even more disturbing, building owners are combining to form building local exchange carriers (BLEC) — telecom providers that specialize in providing telecom services to multitenant buildings. Thus, the independent telecom providers, which are struggling to compete with the former Bell companies, now also must compete with BLECs that have a special advantage in the market.

For this reason, the Association for Local Telecommunications Services (ALTS) believes we have no choice but to pursue a governmental solution to this "market failure." We are willing to negotiate. We are willing to pay fees to cover the costs to building owners of locating equipment in their buildings. We are even willing to pay reasonable fees above the actual costs in order to compensate the landlord for our use of the space.

What we will not tolerate is the flat-out rejection, or worse, the quiet slow-roll that wastes time and energy as we try to resolve issues the landlord has little motivation to resolve.

Our ultimate goal is to restore the right of residential and business consumers to make their own telecom choices. Only then will the marketplace operate freely and fairly.

Windhausen is president of ALTS, a national industry association that promotes facilities-based local telecommunications competition. He can be reached at jwindhausen@alts.org.

NO BY GERRY LEDERER

The era of telecommunications choice, ushered in by technological advances and telecom deregulation, has been embraced by the commercial real estate industry. Building owners understand that they must offer tenants choices not only in communications services, but also in telecom service providers. However, mandating that all telecom providers be given access to office buildings is unnecessary, unmanageable and unconstitutional.

In June, the Building Owners & Managers Association (BOMA) published the largest telecom-related study of office tenants to date, based on responses from almost 2,000 tenants and building owners nationwide. The results show that tenant demand is a strong determinant in which telecom providers gain access to a building — 98% of respondents said building management procured services from a particular provider when asked. Survey results also indicated that more than 80% of buildings are serviced by more than one provider, with almost 60% offering access to three or more providers. Some buildings offer as many as 15 providers.

To say mandatory access would be unmanageable is an understatement. Today, there are almost 600 competitive local telecom providers. How could building owners, or for that matter the Federal Communications Commission, guarantee all 600 access to all buildings?

Furthermore, a one-size-fits-all federal mandate can't address the unique needs of hundreds of thousands of buildings and millions of tenants. Limits exist on available physical space in buildings to accommodate wiring from multiple telecom providers. Owners and tenants face huge security, liability and accountability issues if multiple providers are given unlimited building access. And there's the issue of technological obsolescence — fast-moving market forces demand that property owners be able to adapt quickly to the evolving technology needs of their tenants, yet limits on wiring capacity as technologies change constrain this ability.

Some telecom lawyers are working hard to convince the FCC that buildings are "instrumentalities" of communications and are therefore subject to the rules that govern phone companies because buildings house communications. What's next? Will the FCC soon regulate automobiles because more people have car phones? Will home offices be regulated by the FCC because there's more than one phone line?

For government regulators to intervene in a healthy, well-functioning market just doesn't make sense. Why create massive new regulations where none are needed or revive the very problem the 1996 telecom act was intended to prevent: costly delays in business access to new communications technology?

Instead, let's encourage competition for telecom choice by letting the markets — in telecom and in real estate — work as they do now: unfettered by the heavy hand of government.

Lederer is vice president of research, government and industry affairs for BOMA. He can be reached at glederer@boma.org.

www.nwfusion.com

WHAT DO YOU THINK?

Should landlords be required to give all carriers access to their buildings? Add your thoughts to the debate between ALTS' John Windhausen and BOMA International's Gerry Lederer.

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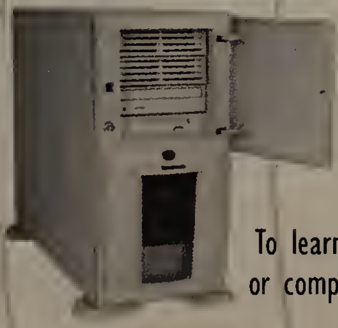

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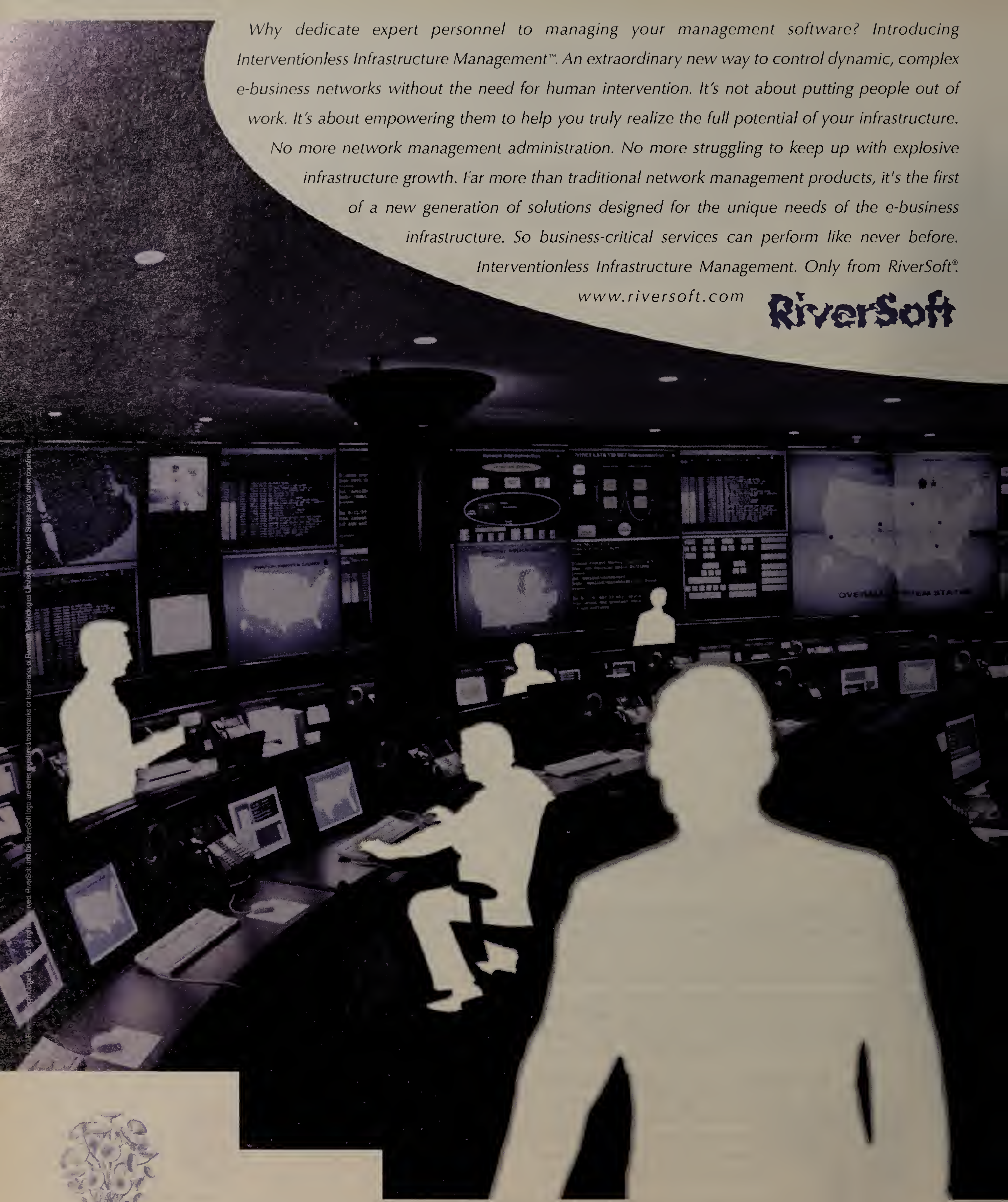

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NetworkWorld REVIEW

Network monitoring

Windows watchers

IpMonitor is tops at keeping a close watch on your midsize Windows network.

BY BARRY NANCE,
NETWORK WORLD TEST ALLIANCE

Problem notification on small, local networks is easy — just listen for the complaints from your co-workers. On large, global networks, an enterprise-level network management platform can keep watch. But for a midsize network (up to several hundred nodes), you'll need one of these monitoring and alerting software packages. While these tools aren't as feature-laden as ones from Tivoli, Computer Associates or Hewlett-Packard, they can automatically detect network connectivity problems, Windows NT operating system problems or both. In fact, two of the tools we reviewed can only monitor IP-addressable devices and SNMP-manageable nodes (see story, page 56). The other seven offer varying degrees of connectivity surveillance and server health monitoring.

Some monitoring and alerting tools can tell you — via e-mail, pager, SNMP alert or other means — that a server's CPU is overloaded, its memory resources are nearly exhausted, its free disk space is precariously low, or that some other error condition exists. In some cases, these tools can reboot a server, restart a service or take other corrective action without your intervention. For connectivity, a tool might ping IP-addressable devices or poll SNMP-manageable devices to alert you to network failures.

Using one of these tools, you get notification of problems earlier than if you waited for users to complain. Remember that the earlier you deal with a problem, the smaller it is, and the later you deal with it, the bigger it is.

Our evaluation focused on Windows-based products that notify network administrators about connectivity and server health problems. We tested nine products: Ipswitch's WhatsUp Gold 5.0, Ripple Technologies' LogCaster 2.6, NetIQ's AppManager 3.4, Breakout Technologies' MonitorIT 2.0, NTP Software's System Sentinel 2000, MediaHouse Software's ipMonitor 6.0, Heroix's RoboMon NT 7.5, Dartware's InterMapper 3.0 and Argent Software's Guardian 4.1A.

MediaHouse Software

IpMonitor

NetworkWorld World Class WINNER

A superior and intelligent problem notification aid for a midsize network. Its monitoring and reporting features, together with its slick user interface, impressed us greatly.

Note: World Class Awards are given to any product that earns a score of 9 or higher in any review.

Our World Class Award goes to ipMonitor, which proved to be a superior and intelligent problem notification aid for our network. Its monitoring and reporting features, together with its slick user interface, impressed us greatly. AppManager and RoboMon NT deserve special mention. Their ability to closely monitor the Windows operating system rivaled ipMonitor's.

nIP those problems

MediaHouse's ipMonitor watches Windows NT/2000 machines for excessive resource consumption (via NT Performance Monitor data), failed NT services and specific event log entries. IpMonitor supervises particular applications, such as Oracle and SQL Server, and it also pings IP-addressable network devices to check for availability and polls them via SNMP to discover their status. The network scanning feature for discovering IP-addressable network devices, like the one WhatsUp Gold uses, is quick and accurate. IpMonitor further impressed us by noting changes to files on our servers, verifying Web page links and maintaining surveillance on our Win 2000 Active Directory data.

In addition to e-mail, pager and SNMP alerts, ipMonitor can also alert an ICQ chat account, issue a network broadcast message, issue a help desk

NetResults

NetworkWorld World Class WINNER

IpMonitor 6.0

RATING: 9.00 COMPANY: MediaHouse Software (888) 956-9559, www.mediahouse.com. **COST:** $695 per server. **PROS:** Monitors Windows and IP-addressable network devices; excellent user interface; useful reports. **CONS:** Should include more application-specific corrective actions.

AppManager 3.4

RATING: 8.30 COMPANY: NetIQ, (408) 330-7000, www.netiq.com. **COST:** $600 per server. **PROS:** Supported the most applications out of the box; superior script language. **CONS:** Requires purchase of SQL Server 6.5 or 7.0.

System Sentinel 2000

RATING: 7.60 COMPANY: NTP Software, (800) 226-2755, www.ntpsoftware.com. **COST:** $1,495 per server and $125 per client. **PROS:** Checks accessibility by logging on to a server. **CONS:** Doesn't track specific applications or nonserver IP-addressable devices.

RoboMon NT 7.5

RATING: 8.25 COMPANY: Heroix, (800) 229-6500, www.heroix.com. **COST:** $595 per server. **PROS:** Clear, unambiguous notification messages; comes with a lot of default notification rules. **CONS:** Weak and unsophisticated scripting language.

LogCaster 2.6

RATING: 6.95 COMPANY: Ripple Technologies, (215) 321-9600, www.rippletech.com. **COST:** $795 per server; $95 per client. **PROS:** Easy setup of filters and rules. **CONS:** Narrow focus — only monitors certain versions of applications.

Guardian 4.1A

RATING: 7.65 COMPANY: Argent Software, (860) 674-1700, www.argent.com. **COST:** Starts at $9,000 for 10 servers. **PROS:** Monitors Windows and network devices. **CONS:** Expensive; needs Crystal Reports for useful reporting.

MonitorIT 2.0

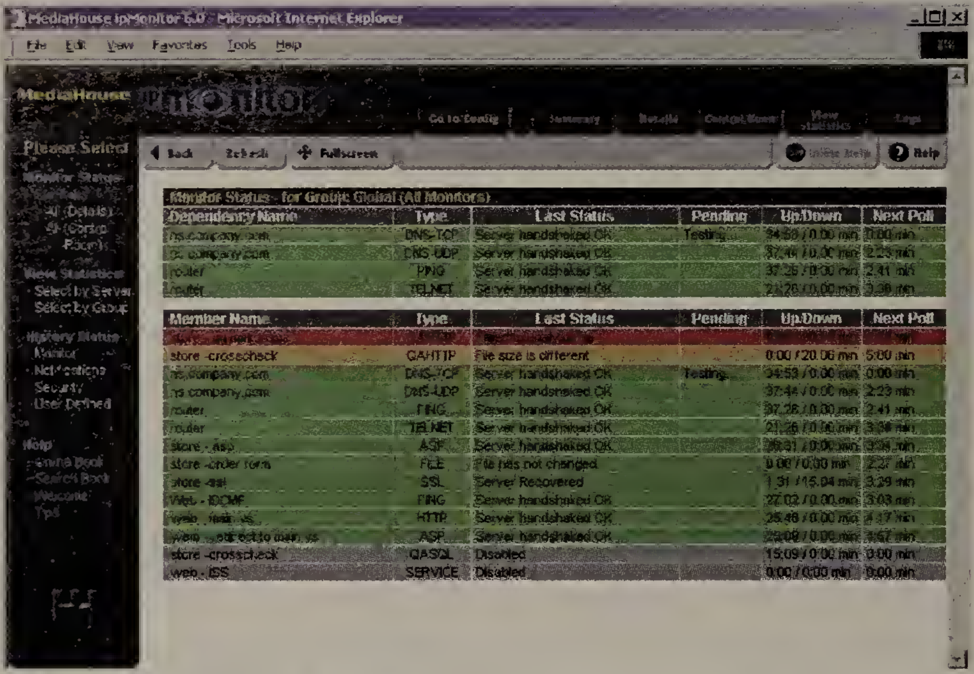
RATING: 6.95 COMPANY: Breakout Technologies, (908) 561-5210, www.breakoutsoft.com. **COST:** $195 for one server and 15 clients; $99 each 10 additional clients. **PROS:** Monitors Windows NT and IP-based devices. **CONS:** Doesn't use SNMP alerts.

	Monitoring 20%	Notification 20%	Corrective action 20%	Reporting 15%	Management 15%	Installation 5%	Documentation 5%	Total score
IpMonitor 6.0	9	9	9	9	9	9	9	9.00
AppManager 3.4	9	7	9	9	9	5	7	8.30
RoboMon NT 7.5	7	9	9	8	9	9	5	8.25
Guardian 4.1A	9	9	7	6	7	8	6	7.65
System Sentinel 2000	7	8	8	8	7	9	6	7.60
LogCaster 2.6	6	8	6	6	8	9	8	6.95
MonitorIT 2.0	8	7	6	9	5	7	6	6.95

Individual category scores are based on a scale of 1 to 10. **Percentages** are the weight given each category in determining the **total score. Scoring key:** 10 — Can't be better; 9-8 — Excellent; 7 — Very good; 6-5 — Average; 4-2 — Needs improvement; 1 — Not supported or doesn't work.

trouble ticket via third-party software or insert an entry into the NT event log. It offered the most corrective action options, including rebooting a server, restarting an NT service or launching a program, batch file or third-party diagnostic utility.

IpMonitor's reports are highly useful and configurable. The supplied report templates include Availability, Response Time, Downtime, Diagnostic Analysis, and Health and Trouble reports. For two user-selectable time intervals (current and historical), the reports show historical activity and can predict trends. Administrators can designate one or more e-mail address destinations for each report. IpMonitor stores monitoring parameters and statistical performance data in its internal database.



Monitor Status - for Group: Global (All Monitors)

Dependency Name	Type	Last Status	Pending	Up/Down	Next Poll
ns.company.com	DNS-TCP	Server handshaked OK	Testing	[illegible] / 0.00 min	0.00 min
ns.company.com	DNS-UDP	Server handshaked OK		[illegible] / 0.00 min	2:23 min
router	PING	Server handshaked OK		37:26 / 0:00 min	2:41 min
router	TELNET	Server handshaked OK		[illegible] / 0.00 min	[illegible]

Member Name	Type	Last Status	Pending	Up/Down	Next Poll
[illegible]	[illegible]	[illegible]		[illegible]	[illegible]
store - crosscheck	CAHTTP	File size is different		0:00 / 20.06 min	5:00 min
ns.company.com	DNS-TCP	Server handshaked OK	Testing	34:53 / 0:00 min	0:00 min
ns.company.com	DNS-UDP	Server handshaked OK		37:44 / 0:00 min	2:23 min
router	PING	Server handshaked OK		37:26 / 0:00 min	2:41 min
router	TELNET	Server handshaked OK		21:26 / 0:00 min	[illegible]
store - asp	ASP	Server handshaked OK		[illegible] / 0:00 min	[illegible]
store - order form	FILE	File has not changed		0:00 / 0:00 min	2:27 min
store - ssl	SSL	Server Recovered		1:31 / 15.04 min	3:29 min
Web - IDCMF	PING	Server handshaked OK		27:02 / 0:00 min	3:03 min
web - [illegible]	HTTP	Server handshaked OK		25:48 / 0:00 min	[illegible]
web - [illegible]	ASP	Server handshaked OK		[illegible] / 0:00 min	[illegible]
store - crosscheck	QASQL	Disabled		15:09 / 0:00 min	0:00 min
web - IIS	SERVICE	Disabled		0:00 / 0:00 min	0:00 min

IpMonitor's Web-based Monitor Status function shows server health and network connectivity at a glance.

The ipMonitor Web-based interface is well-designed and slick. IpMonitor's use of colors to indicate the status of a monitored device or parameter (green for OK, yellow for a new problem, red for a problem for which notifications have been issued and dark red for older problems for which ipMonitor has already transmitted several alerts) provides a great deal of information to anyone who glances at the Monitor Status window. Through ipMonitor's Web pages, we could choose monitoring tasks to run, indicate the schedule on which they should run, and view ipMonitor's reports and status displays.

Installation was a breeze. The printed documentation is a simple "Getting Started" booklet, but the online help is comprehensive, clear and context-sensitive.

An application perspective

The monitoring agents of NetIQ's AppManager impressed us by detecting broken trust relationships across Windows NT/2000 domains, identifying hung and terminated NT/2000 services, noting which applications caused excessive CPU or memory usage, and tracking the number of open shared files. It discovered which users consumed the most SQL Server resources (CPU, memory, disk I/O and locks), and it monitored Exchange throughput and Internet Information Server (IIS) connections and session timeouts. Via SNMP, AppManager discovered and monitored our network devices and non-Windows computers.

Like ipMonitor, AppManager could monitor Windows NT/2000's performance parameters, event logs, registry, services and specific applications running on NT/2000, such as Oracle, SQL Server, Exchange, Lotus Domino, Citrix MetaFrame, Citrix WinFrame and SAP R/3. Its easy-to-understand script language for creating rules and defining behaviors is a dialect of Microsoft's powerful and popular Visual Basic.

AppManager can notify administrators of problems via e-mail, pager calls or SNMP alerts. But it doesn't send network broadcast messages, nor does it issue help desk trouble tickets through third-party software. In addition to its other corrective actions, we liked AppManager's ability to interact with a database through Open Database Connectivity (ODBC).

We found setting up AppManager's real-time reporting of performance factors especially easy. By merely dragging and dropping script icons onto target computers in the Win32 console's tree view, we quickly defined several reports that AppManager immediately began running. The real-time graphs of system activity also let us drill down for details, such as which SQL statements were causing excessive CPU usage in SQL Server. AppManager's reports also showed system status and inventory data. For example, we could see exactly which files were being shared by each server, as well as the IP addresses of network adapters installed in the NT machines. AppManager can produce more than 200 reports.

The Win32 native console and browser-based interface offered the same functionality and were easy to navigate. Each displayed information clearly and intuitively. The multithreaded Win32 console, we noted, was amazingly responsive during our tests.

AppManager's installation process is almost child's play. However, it requires that you already have SQL Server 6.5 or 7.0, which adds considerably to the total cost of the product and caused us to lower the product's installation score-card entry. The printed documentation is clear and professionally done, as is the online help. However, the printed documentation defers to the online help in many places, especially with respect to setting up corrective actions.

Hey, mon! A network repair robot

Although architecturally different, NetIQ's AppManager and Heroix's RoboMon NT have similar features, strengths and weaknesses. We gave RoboMon NT lower scores because it didn't monitor quite as many applications as AppManager, its script language was less powerful and the printed documentation wasn't as good.

RoboMon NT monitored many aspects of our Windows NT/2000 servers and clients. It even took steps to correct some problems before they affected our network. For example, when we flooded a shared printer queue with print jobs in one test, RoboMon NT redirected a portion of the print jobs to an alternate printer queue to head off what otherwise would have been a stand-around-the-printer-waiting-for-my-printout bottleneck. (We enabled pop-up print job completion notifications to send people to the right destination printer.) However, RoboMon NT can't monitor Exchange 2000, SAP R/3 or Lotus Domino R5.

Configuring rules to direct RoboMon NT's behavior is simple and painless, but the script language for creating monitoring rules is weak and unsophisticated. The product includes useful default rules for diagnosing problems, checking system statistics and monitoring network performance.

In another test of RoboMon NT's ability to keep our network up and running, we overloaded an NT machine with several concurrent tasks. RoboMon NT, using one of its many configurable rules, clearly and descriptively displayed the message, "The number of processes on the system is too high." Clearly and unambiguously, it also told us our Dynamic Host Configuration Protocol address pool was almost empty.

For the overall network beyond NT servers, we were disappointed that RoboMon NT monitored just Cisco network devices. RoboMon also runs on Unix and OpenVMS, but we didn't test those versions.

Rule-triggered behaviors can consist of notification, corrective action, rule modification and variable modification.

Rule modification can enable, disable or reschedule other rules. Variable modification changes one or more of RoboMon NT's internal settings, which then dynamically affect other rules.

We found we could have a rule keep an eye on virtually any NT activity we wished. These activities included NT Performance Monitor items, event log entries, Oracle or SQL Server relational database changes, application log file entries, Component Object Model changes and Windows Management Interface events. RoboMon NT even distinguished between chronic problems, persistent problems and new ones. It stores rules and the network data it collects in a Microsoft Access database it creates by default. You can alternately use SQL Server.

RoboMon NT's reporting tools, Report Manager and Graph Manager, present numerous ways to view current and historical network activity. The Graph Manager displays relationships between statistics that RoboMon NT collects, and Report Manager offers reports by group (disk, event, Exchange, Internet, process and system). For example, the system report group menu consists of summary, cache, physical memory, page file, CPU usage, CPU rates, file I/O, TCP/IP, client/server, Web server and SQL Server reports. However, RoboMon NT lacks a trend analysis reporting function.

RoboMon NT's user interface is intuitive and easy to master. Accessing RoboMon NT's dispersed network components via a central Enterprise Manager module makes a network administrator highly productive.

Installation takes between 5 and 10 minutes, during which you have to tell RoboMon NT what each agent is monitoring. The printed documen-

See **Review,** page 56

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Review
Continuted from page 54

tation, consisting of merely a start-up manual, is of poor quality. Paradoxically, the online documentation is comprehensive and clear.

A guardian angel

Like ipMonitor, RoboMon NT and AppManager, Argent Software's Guardian is essentially a Windows watcher that can monitor many different Windows NT/2000 parameters and applications. Like Ripple Technologies' LogCaster, Guardian can also keep an eye on Linux computers. To discover and monitor network devices such as routers and switches, it can also send IP pings and SNMP polling requests across the network.

However, Guardian's corrective action feature was more difficult to configure, it has a dearth of built-in reports and the documentation wasn't as good. And because it starts at $9,000 for 10 servers, Guardian is expensive for small networks.

The monitoring process is completely configurable and uses an object-oriented, rule-based design. We liked Guardian's scheduling feature for running recurring monitoring tasks. The scripting language is proprietary and quite unlike the script languages within RoboMon NT, AppManager and LogCaster. Each rule set specifies how Guardian should perform its problem detection. A rule set can have up to eight classes: event, performance, program, service, SNMP alert, command, system down and printer. Creating a working rule set is a matter of selecting rules within each class and choosing one or more notification methods.

The Guardian Predictor module's built-in reports consist of just a service-level agreement monitoring report and system resource report. However, Guardian stores its monitoring parameters, performance data and network device status information in its ODBC-accessible database. Guardian suggests the use of a reporting tool such as Seagate Software's Crystal Reports to depict its data. In contrast, NetIQ's AppManager has more than 200 built-in reports, which made AppManager much more useful out of the box.

The native Win32 user interface is easy to navigate and simple to operate. Guardian's Web interface can display server status information and the product's limited set of built-in reports, but it lacks the Win32 console's ability to configure Guardian.

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TWO OTHER 'NETWORK' MONITORING OPTIONS

If you don't use Windows NT or you're really only interested in network monitoring rather than operating system monitoring, Dartware's InterMapper 3.0 or Ipswitch's WhatsUp Gold 5.0 might be just the ticket.

Dartware's InterMapper is a Macintosh-based tool that monitors a network for device status and availability. It's appropriate for AppleTalk-based networks consisting entirely or almost entirely of Macintosh computers.

Starting at a particular DNS name or IP address, InterMapper uses a combination of SNMP polls, IP pings, AppleTalk echo packets and Domain Name System (DNS) and Name Binding Protocol (NBP) queries to discover network devices. The SNMP requests InterMapper sends out include DNS server, User Datagram Protocol (UDP) Listener, Real Time Streaming Protocol, Lightweight Directory Access Protocol, RADIUS, KeyServer, Dynamic Host Configuration Protocol, APC Uninterruptible Power Supply, Network Time Protocol (NTP), HTTP Proxy, HTTP Post, 4D Server and FileMaker Pro. Based on the hierarchical order in which the devices are discovered, InterMapper creates a map showing their connections.

InterMapper can notify administrators of problems through e-mail, pager, AppleEvent or SNMP alert. For corrective action, it can cycle power through a PowerKey Pro unit (a remote-control type of power strip) to rather forcefully reboot a Macintosh server. InterMapper can't restart programs, launch repair utilities or update relational databases with SQL.

In addition to producing an SNMP-based map of the network, InterMapper can overlay the map with the history of one or more variables, such as switch or router availability. The overlaid image is termed a "strip chart," and it appears as a floating window linked to the map on which the network device exists. InterMapper can also log the data for later export into a database program (such as FileMaker Pro) for further analysis.

It presents a typical Macintosh interface that's easy to navigate, and it also offers a Web-based interface with customizable Web pages. By creating templates for the Web pages InterMapper displays, we were able to tailor its appearance to our liking. Each customizable Web page is essentially a server-side script containing HTML statements and variables whose values you can set.

InterMapper is a breeze to install. Unfortunately, the all-too-brief documentation is entirely online at Dartware's Web site. You'll need an Internet connection and browser whenever you want to refer to it.

What's up?

WhatsUp Gold has come a long way from its simple beginnings as a freeware download, but it retains its simple and uncluttered nature. Like InterMapper — and unlike the other products we reviewed — WhatsUp Gold monitors the network rather than a particular operating system.

We were especially keen on WhatsUp Gold's autodiscovery function, called SmartScan, which used router tables to identify our network segments during the monitoring process. The network mapping process used SmartScan's hierarchical connectivity data to create separate maps for each subnet instead of drawing a single map containing all devices.

The supplied SNMP Management Information Base (MIB) browser is almost rudimentary. WhatsUp Gold doesn't offer graphical point-and-click drilling down into MIBs, nor does it give you usage baselines for devices. Rather, it performs a simple poll of the network via SNMP to capture device status information.

WhatsUp Gold tracks SMTP, HTTP, DNS, FTP, Post Office Protocol 3, IMAP, telnet and other common services. Its quick and accurate discovery process and its informative status and availability charts are WhatsUp Gold's strong suits. It also includes ping, port scanning and throughput utilities. The product doesn't monitor server processes on Windows NT or any other platform.

WhatsUp Gold can notify administrators of problems through e-mail, text-capable pager or beeper. Setting up an e-mail alert telling us of unavailable devices and showing the last several lines of the NT event logs took just a few minutes to configure. However, WhatsUp Gold lacks the ability to take corrective actions.

The product's network event and statistics reports are extremely useful for tracking device and service outages. WhatsUp Gold incorporates a Crystal Reports plug-in for producing a range of reports, such as an availability report showing devices whose failures have resulted in the greatest downtime. Nonetheless, because they didn't let us drill down into SNMP alert details, the reports weren't as granular as we would've liked.

The interactive Web page interface was a joy to use and encompassed all the functions of the Win32 native interface. For example, it let us check the status of any network device from a remote location, using only a dial-up connection and Web browser. On the other hand, for many of its displays, WhatsUp Gold simply scrolled lines of text in the Win32 console's window and the Web browser window when it ought to have formatted one or more data presentation screens.

Installation is unremarkable, and the printed documentation is perfectly adequate.

— Barry Nance

WhatsUp Gold 5.0

COMPANY: Ipswitch, (781) 676-5700, www.ipswitch.com. **COST:** $695 per server. **PROS:** Accurate discovery of devices; useful status charts. **CONS:** No server-level monitoring; no corrective actions.

InterMapper 3.0

COMPANY: Dartware, (603) 643-2268, www.dartware.com. **COST:** Starts at $295 for 10-node network. **PROS:** Excellent awareness of Apple-based network devices. **CONS:** No server-level monitoring; can only read documentation while connected to Dartware's Web site.

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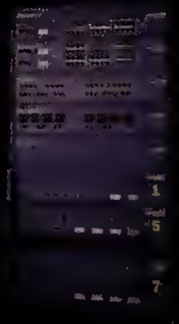

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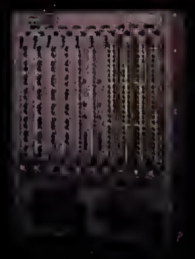

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Review

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In addition, the Web interface requires IIS and doesn't work with Netscape or Apache Web servers.

Installation was straightforward. The documentation, a downloadable collection of PDF and Word for Windows document files, is comprehensive but lacks polish. In places, it's cryptic and seems to have been written by a software engineer.

Halt! Who goes there?

NTP Software's System Sentinel 2000 is a Windows watcher with a twist — pretending to be a user (using account IDs and passwords you specify), it can log on to remote servers to check accessibility as well as availability. It can also propagate System Sentinel configuration changes across multiple System Sentinel servers.

Like Heroix's RoboMon NT and NetIQ's AppManager, System Sentinel tracks Windows NT/2000 event log entries, services and Performance Monitor statistics. Via IP pings and SNMP polling, System Sentinel also monitors the health of network devices. However, it doesn't track specific applications running on NT/2000 or changes to the registry.

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DocFinder 9730

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When System Sentinel detects a problem, it can send e-mail, call a pager, update a relational database via ODBC or transmit an SNMP alert. Its corrective action options include launching a program or batch file, restarting a failed service, starting or stopping remote services and rebooting the computer.

By the time you read this, NTP Software says it will have incorporated a new reporting tool in System Sentinel. In the version we tested, the new report module provided a detailed history of Windows NT/2000 events that we could sort by event type, date, source, category, computer and other criteria. The new reporting tool also has a primitive trend analysis reporting capability.

The user interface is Explorer-like, with an expandable/collapsible list of System Sentinel configuration entries on the left and, for selected configuration entries, detailed information on the right. There is no Web-based interface.

Installation is simple. The printed documentation consists of just an installation and quick-start guide, and the online help is incomplete and sometimes confusing.

Casting for network problems

Ripple Technologies' LogCaster does a good job of monitoring Windows NT/2000 event logs, performance data, TCP/IP-based devices and certain services. Using filters that took us just minutes to set up, LogCaster selected and consolidated entries in our event logs and then notified us when problems occurred. Its monitoring of NT/2000 services and performance data similarly produced notifications when, for example, a particular service unexpectedly died or CPU utilization approached 100%. At intervals we specified, LogCaster's TCP/IP Watcher pinged our routers, Web servers and TCP/IP clients to identify network failures.

LogCaster also has a Syslog Watcher monitoring tool for spotting problems as they crop up in Unix or Linux log files. Syslog Watcher works by translating User Datagram Protocol (UDP) messages it receives on Port 514 into NT event log entries. LogCaster includes plug-ins for monitoring Citrix MetaFrame servers and Check Point Software Firewall-1 servers.

In all cases, LogCaster's monitoring agents insert entries in the NT/2000 event logs. Selected log entries then trigger LogCaster's problem notification process.

LogCaster's focus is quite narrow. For example, the service monitoring agent only works with Exchange 5.5, IIS 4.0, Proxy Server 2.0 and SQL Server 7.0. It doesn't monitor for Oracle, Active Directory, SNA Server, SAP R/3, Terminal Service, Citrix WinFrame or Lotus Domino. Furthermore, if a problem doesn't manifest itself in the Windows NT/2000 event log (either on its own or through a LogCaster agent), LogCaster won't see it.

LogCaster can send problem notifications via e-mail, pager, SNMP alert and, via ODBC, a relational database. Its corrective-action feature can launch a program or batch file to fix a specific problem. Ripple Technologies doesn't provide any repair options such as "restart this service" or "update this database with these SQL statements."

LogCaster's reports are line graphs depicting one or more monitored statistics, such as available memory bytes per server, for a specific time period. Unfortunately, LogCaster's reporting tool can't produce list- or tab-format reports.

We liked the ability to define Business Groups in LogCaster. We used this feature to designate whether an NT machine was in a System Group or a particular Business Group, then produced reports (graphs) that distinguished monitored statistics by type of machine.

The Win32 console's user interface is straightforward and intuitive, and its dialog boxes are especially easy to understand and navigate. The telnet interface for remote administration is functional but far from elegant. LogCaster doesn't have a browser-based interface.

LogCaster's installation process is simple and doesn't require rebooting NT or Windows 2000. The printed documentation is thorough and clear.

Monitoring IT

Like ipMonitor, RoboMon NT and AppManager, Breakout Technologies' MonitorIT monitors Windows-based computers. However, its server component runs on Windows 95/98 as well as Windows NT/2000. It can also ping IP-based network devices to determine connectivity and availability, and it can poll servers to monitor for HTTP, FTP, SMTP, POP3 and Domain Name System activity. From all the Windows machines on the network, MonitorIT gathered the performance and configuration data we selected from its menus. The menu items we could choose from included cache, Distributed Transaction Coordinator, HTTP indexing service, memory and network interface.

MonitorIT's notification methods include sending e-mail, calling a pager and launching a program to take corrective action (the program runs on the MonitorIT server, although the problem may have occurred on a different machine). MonitorIT doesn't transmit SNMP alerts.

For our Windows machines and IP-addressable devices, the reporting tool gave us excellent real-time and historical views of availability, performance and selected monitored events. Using the predefined report templates showed us NT Server general performance, file server performance, IIS performance and other data. The product's built-in inventory reports listed IP-addressable computers and MonitorIT configuration data.

MonitorIT's score-card value for management is lower because its native Win32 interface is not intuitive. When defining an alert (for example, setting up a threshold to be monitored), the program starts off in a "review mode." You must click on New or Edit buttons to enter alert parameters. Furthermore, the interface expects you to hover the mouse cursor over what it terms Counters and Objects to see a selectable list of those Counters and Objects. In contrast, the product's Web interface is much easier to use and offers remote access to all MonitorIT's administration and reporting functions.

MonitorIT installation is complicated only by the need to choose whether to use SQL Server or MonitorIT's internal database to store the monitoring thresholds and performance data. The printed documentation and online help are adequate.

Network administrators deserve a useful task automation tool that can keep a watchful eye on servers and network devices. For keeping small to midsize Windows-based networks up and running, we strongly recommend MediaHouse Software's ipMonitor. It can shoulder a considerable portion of a network administrator's NT server monitoring burden as well as quickly detect network device connectivity problems. NetIQ's AppManager and Heroix's RoboMon NT are also excellent early-warning tools for discovering and dealing with Windows server errors and network issues.

Nance, a software developer and consultant for 29 years, is the author of Introduction to Networking, *4th Edition and* Client/Server LAN Programming. *His e-mail address is barryn@erols.com.*

Nance is also a member of the Network World Test Alliance, a cooperative of the premier reviewers in the network industry, each bringing to bear years of practical experience on every review. For more Test Alliance information, including what it takes to become a member, go to www.nwfusion.com/alliance.

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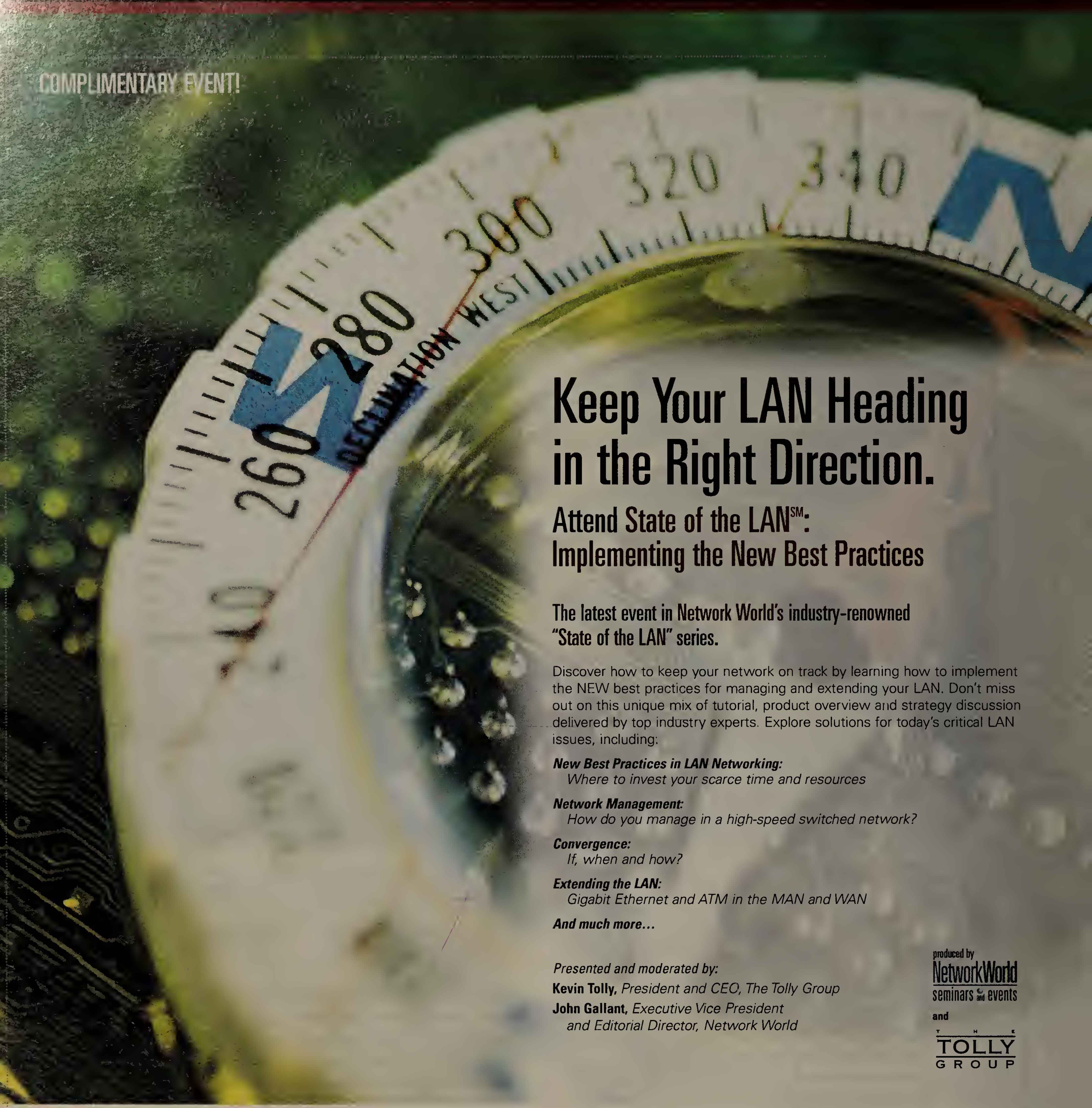

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Management Strategies

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Go team

How to determine if a project calls for a group effort or if it's better suited for one person.

BY KIMBERLY MCGRATH

When Mark Aronson needed to select an Internet browser for his organization — a simple choice, but one that would affect 3,000 to 5,000 people — his first step was to form a team.

Aronson, LAN/WAN manager with the Massachusetts Department of Mental Health in Boston, says while the team was assembled and disbanded in less than one week, the project required input and feedback from many people. The group chose Internet Explorer because it came with Outlook and some of the organization's Web development was optimized for the browser.

Aronson opted for the team approach because "people learn something new every time they work as part of a team," he says.

Attaining knowledge is just one reason to have employees work together. Others include saving time and having the project benefit from a system of checks and balances.

So what creates an effective and successful team?

Joseph Gott, systems manager of the Eastern Municipal Water District in Perris, Calif., believes it begins with letting all potential team members be included in the initial planning. "This allows all to take a certain ownership," he says.

Giving employees an active role in developing the project plan helps prevent them from viewing the work as something that was dumped on them.

"It's not a situation where they are told, 'Thou shall do this project.' That's a sure way to create contention," Gott says.

For Kim Brookes, director of the Office of Information Technology at the Radcliffe Institute of Advanced Study at Harvard University in Cambridge, Mass., creating an effective team begins with clearly assigning tasks and responsibility.

"You must show each person how his piece fits into the larger mission," Brookes says. "This allows people to see the importance and relevance of their work."

Naturally, the larger mission must first be defined, says Tom Thomas, computer systems administrator of the Media and Technology Center at the Hawaii Pacific University in Honolulu.

Clear communication is a chief ingredient of a successful team. "Communication is key. An understanding problem can severely disband a team," Aronson says.

Monthly, bimonthly or weekly meetings with the team can help each player remain informed. In addition to weekly meetings, Gott sets up an e-mail group and sends a message to the list whenever any milestone or problem occurs. "It helps to keep all the players involved and focused," he says.

Of course, projects are also more likely to succeed if you have the right people working on them. "Ideally you want knowledgeable people who are interested in the project and are willing to work," Aronson says.

Along with competence, Doug Griswold, LAN/WAN engineer at the Raymond W. Bliss Army Health Center in Fort Huachuca, Ariz., looks for dependability.

"You don't want someone who is blowing smoke and then when you get out on the field find out that this person is a straw man who blows down in the first wind," Griswold says. "You don't want to be left scrambling to cover his butt or your own butt."

It's also important that folks have a good attitude. "Each team member must respect and appreciate the skills that every other team brings to the table. They don't necessarily have to love one another, but they must respect one another," Gott says.

When Griswold assembles a team, he looks for people with diverse backgrounds, including employees who aren't part of the IT group. "Technical people are usually focused on what we need, as far as hardware and software, but we don't always necessarily perceive how the program is utilized by other people," he says. "A majority of the projects we work on ultimately serve non-IT people. Getting their input is crucial."

For example, when Hawaii Pacific University's Thomas was helping to create a distance-learning course database that would let instructors post syllabuses and presentations, he knew the project would require input from faculty members.

Although, gathering lots of feedback and assigning a project to a group isn't always the best approach.

Mark Aronson of the Massachusetts Department of Mental Health says communication can make or break a team.

KATHY TARANTOLA

Smaller, more straightforward projects or those that are based on fact instead of opinion are often best suited for an individual, Aronson notes. "I had a surge protector project recently that was definitely a one-man job. It was easy to pull the information together and present the facts to management," he says.

However, fairly basic projects occasionally require a team just to get them done. One such scenario may be when you have a tight deadline and there's a lot of work to do. Gott says he will sometimes use a team for a simple project like a PC upgrade. When you're talking about more than 400 computers and the only time you can work on them is on the weekend, many hands are needed.

"IT professionals tend to be individuals who desire to work independently. If you can create a mission and tie your key players to a central mission while still allowing them autonomy, results are usually guaranteed," Radcliffe's Brookes says.

McGrath is a freelance writer in Weymouth, Mass She can be reached at kim0807@aol.com.

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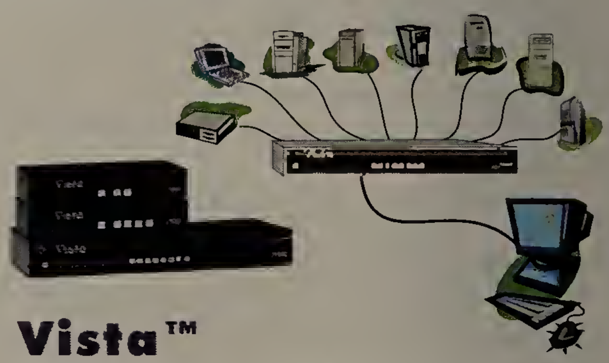

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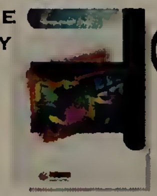

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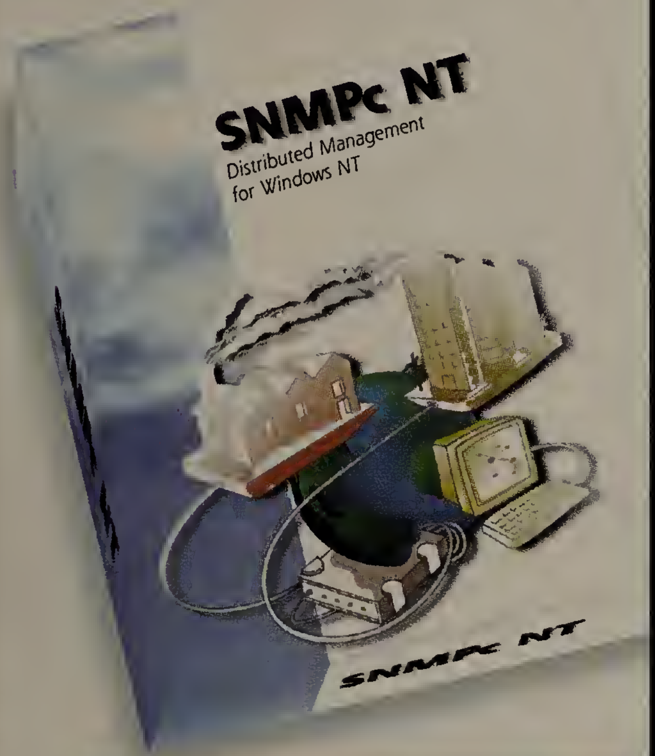

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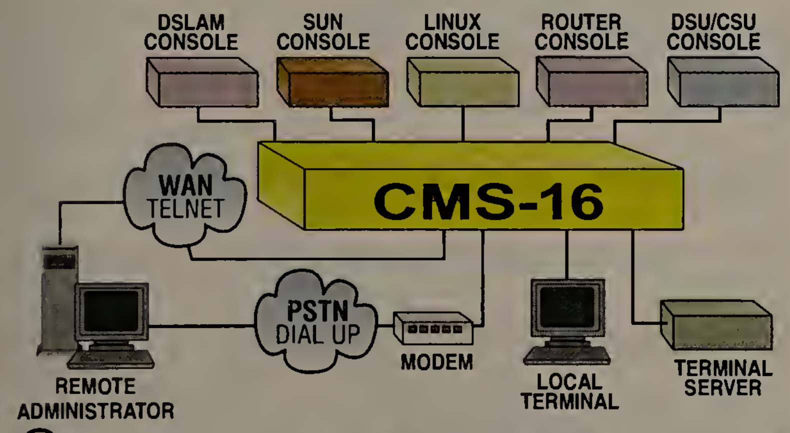

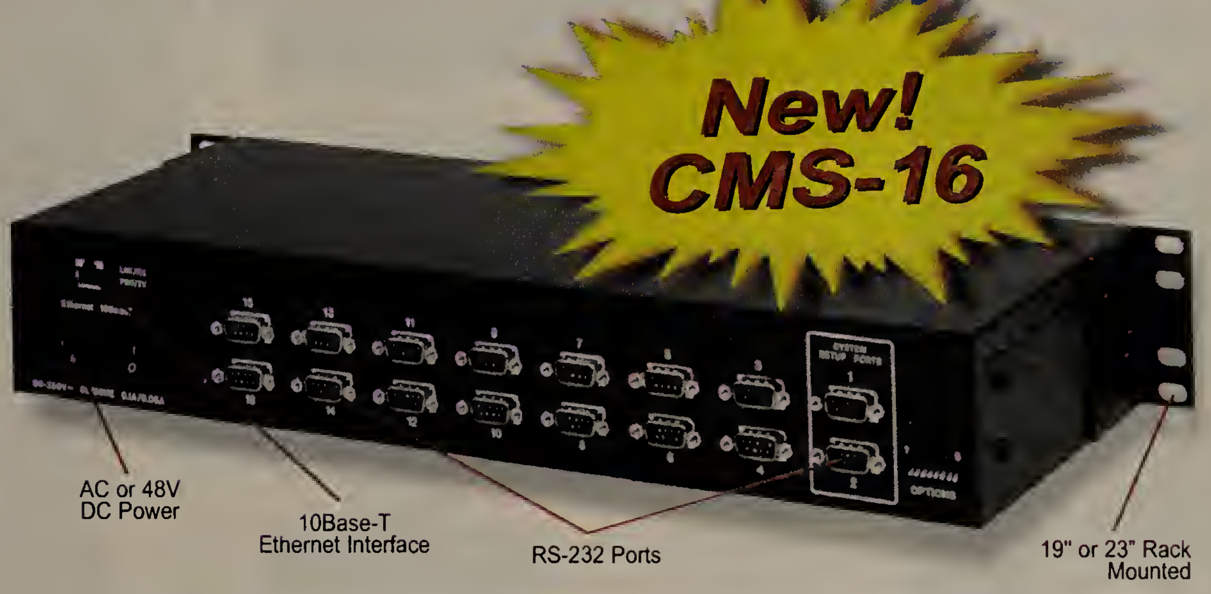

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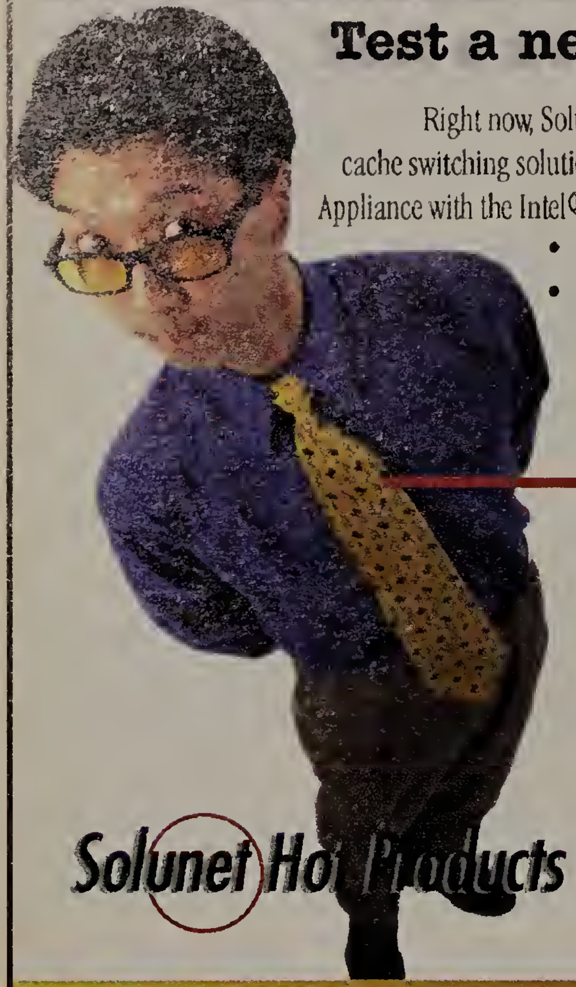

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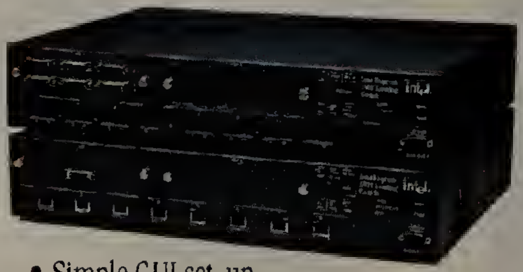

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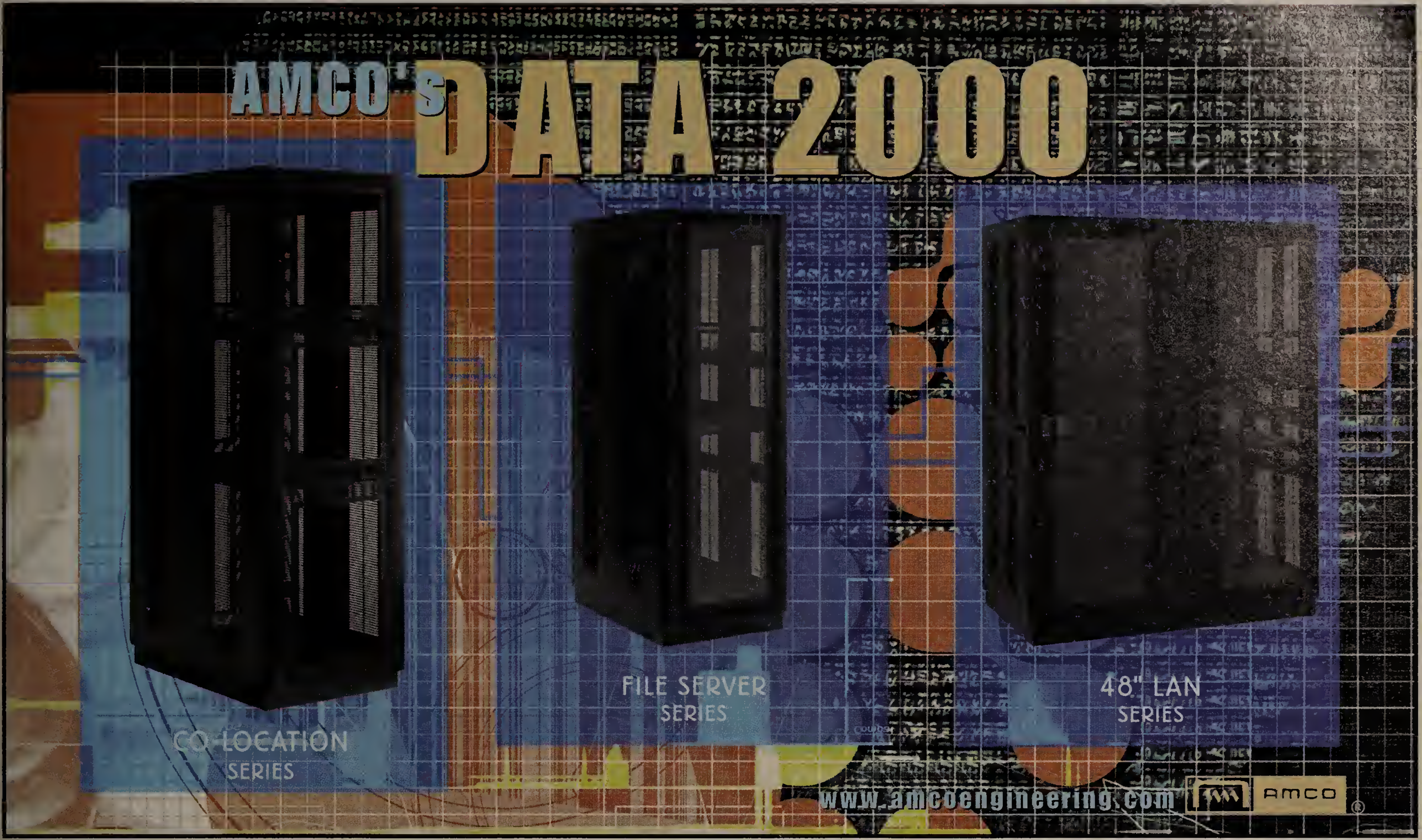

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Software Engineer, 40 hrs/wk, 8:30-5:00, M-F, $65,604/yr. Design & develop computer applications, including using Object Oriented Methodologies in internet applications development; evaluate interface between hardware & software; develop software testing procedures; & use JAVA, VC++, TCP/IP Sockets & HTML. Reqs: Master's (or foreign equiv.) in Computer Eng'g, Comp. Science, Electrical Eng'g or Electronic Eng'g or equiv. in edu. & exp. & 3 yrs. exp. in job offered or in related occup. such as Sys. Analyst, Consultant, Sys. Eng'r, Assoc. Program/Analyst, Teaching Assistant, Lecturer, or any other computer related occupation. Related exp. must have included at least 1 yr. exp. in job offered. Will accept Bach. (or foreign equiv.), followed by at least 5 yrs. of progressive exp. in the specialty, in lieu of req. edu. & exp. Employer Pd. Ad. Mail 2 copies of resume & copy of ad to Dept. of Labor, Licensing & Regulation, 1100 North Eutaw Street, Room #201, Baltimore, MD 21201, JOb Order No. 9686094. Job Location: Germantown, MD.

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Arbitron is a leading media information service company providing internet based software solutions that will shape the future of the broadcasting industry. We offer a challenging, dynamic environment where you can be creative, express yourself and enjoy personal and professional growth.

We're seeking senior level people to complete our development and design teams at our Columbia, MD location. We're hiring for talent, so if you've got it, we want it!

Current projects include designing, creating and maintaining software that helps advertisers decide how to spend their money based on the consumer and media data we gather. Visit our website to learn more about how we're *revolutionizing* the media measurement industry, and how we can help you put your career into high gear!

Lots of database design or data warehousing experience? We need 'big picture' ***Enterprise Developers*** to piece together project puzzles and use their concrete implementation experience to lay the foundation for our most cutting edge software projects. Experience with Designer 2000 necessary; OO technology, and ETL tools is a plus!!

Is software EVOLUTION more your style? New and current products require several skilled **mid and senior level *Software Developers*** who have developed business applications to work with teams to analyze and solve complex business issues.

- ***Visual C++ Programmers*** with MFC and ORACLE - with some JAVA and UNIX - are a big PLUS
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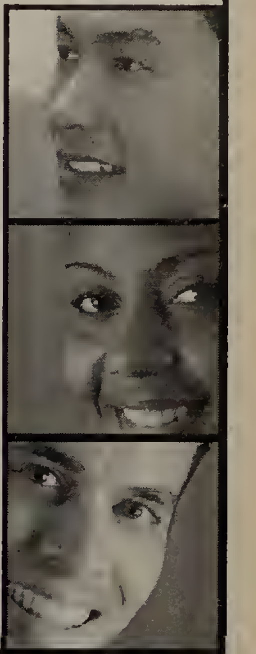
- ***COBOL Programmers*** with either UNIX or ORACLE - both skills are a plus-with some JAVA and C++ - an even bigger **PLUS**
- ***JAVA Programmers*** with UNIX and ORACLE - with C++ is a plus!!
- ***Visual Basic Developers*** with 6 + yrs VB or Visual FoxPro or Visual C++ with OO design



Are you a software ARTIST? New business ventures require several **senior level *Software Designers*** with the communication, software and organizational skills and the ability to translate user requirements into reality. If you've got expertise with large projects, multiple systems and database design experience, this job is for you! If you've got DCOM, COM, or CORBA experience, that's a PLUS!

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Manhattan Associates, Inc., a worldwide leader in supply chain synchronization systems is looking for analysts and developers to join our team at our Atlanta & Raleigh locations. $50K and up. Current openings include:

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PKMS Implementation Consultants. Coordinate client projects & interact with client org. Evaluate client bus. operations & sys environments to implement client proprietary software sys. Advise & design sys test plans. Assist in development of test & production environ. at client sites. Assist in develop. of proposals & supports for sales presentations. BS in comp. sci, engg, or related tech. field. Substantial travel req.

Software Developers. Assist in defining sys scope & requirements, analyze use of existing sys requirements, & design & develop sys in light of future directions in hardware & software growth. Develop & direct design of software sys. MS in comp. sci, engg, or related tech. field. Technical knowledge of: RPG/400, or C++ & CORBA on a Unix or NT platform with an Oracle database utilizing class design & class implementation, or Micro-Focus Cobol on a Unix platform with an Oracle database, or PowerBuilder or COM/VC++/Visual Basic demonstrated through edu. or exp.

Software Analysts. Design, develop, code, test & debug software applications. Req. BS in comp. sci, engg, or related tech. field. Exp. to include 6 mths using RPG/400, MF Cobol, PowerBuilder ,or C++, or COM/VC++/Visual Basic.

Senior Software Engineers. Develop & direct software programming, documentation & sys testing procedures for software program applications. Req. MS in technical field (comp. sci, IT, math, engineering, physics, etc) & 3 yrs exp in programming, analysis, design, development or tech leader or a BS in a technical field & 5 yrs exp in programming, analysis, design, development or tech leader. Exp. to include at least 6 mths with full life cycle development using C++, PowerBuilder, MF Cobol, RPG/400 UNIX/COBOL, or COM/VC++/Visual Basic.

Product Consultant: Product consultant for user configurable warehouse software package on AS/400 platform; assure usability for clients, release documentation, functional document specifications and other quality and usability issues. Develop functional product expertise and articulate complex software functionality features and issues to customers and development, training and consulting team members. Requires BS technical field and 1 yr exp. in logistics or warehousing industry.

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- Analysts – Systems/Security/Business — Job Code: CL828
- SQA Engineers — Job Code: CL829
- Network Engineers — Job Code: CL830
- Systems Administrators (NT and/or UNIX) — Job Code: CL831

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Database Administrator: NC; Install, configure, maintain and upgrade DB2 and Sybase under AIX environment; Design and Implement system security management procedures and conduct performance tuning of the Databases using Visual C++ and PowerBuilder GUI tools; Req BS Engg. or equivalent in Electronics/Communication and two years exp in Database administration under Sybase and DB2 using Visual C++ and PowerBuilder GUI tools; Salary $80,000 per year (Mon-Fri 8.00am-5.00pm) 40 hours per week. Please apply to the nearest job service office, or submit a resume to: Job Service 1105 Briggs Avenue, Durham, NC 27703. Resume must include applicant's social security number and job order number NC3014719 and DOT code 039.162.010

Principal Software Engineer: Provide technical leadership in the architecture, design and implementation of networking software that can support thousands of virtual private network connections. Participate in the design and development of very-high throughput data routers including design and verification of ASICs that are the controlled and data elements of the routers. Requires: 7 years experience in embedded telecom development. Working knowledge of IP Protocol suite including IP, UDP, TCP, ICMP, ATM software and hardware, SNMP and network management applications, and testing and debugging for tracing and analyzing tools for Ethernet and ATM. Demonstrated skills in C, C++ and PowerPC assembly. 40 hrs/wk (9 to 5); $110,000/year. Send two resumes/responses to Case No. 20001983, Labor Exchange Office, 19 Staniford Street, 1st Floor, Boston, MA 02114.

SOFTWARE ENGINEER: Experience in Configuring and Maintaining Critical Production Oracle Databases in Real-Time Client-Server environment. Expertise in Oracle performance and Recovery Management. Knowledge of Distributed Databases and its functioning. Experience in smooth handling of crucial database upgrades from version to version. The job involves working in Oracle database and skills in SOL and PL/SOL code writing. The duties include exporting and importing databases for backups and also for creation of additional databases. Manage multiple databases connected via DB links and snapshots. Requires Bachelor's in Computer Science with 5 years experience in software development. 40 hours per week at $84,000 per year. Please send 2 copies of resume to Case # 20002599, Labor Exchange Office, 19 Staniford St, 1st Floor, Boston, MA 02114.

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Project Manager wanted by Technical & Product Data Mgmt Co in Beverly, MA. Must have Bach in Comp Sci or equiv & 5 yrs s/ware exp. Respond to: HR Dept, SmarTeam, Inc., 900 Cummings Center, Ste 307T, Beverly, MA 01915.

SYSTEMS ANALYST {Manhattan) Software consulting co. seeks Systems Analyst exp. in complete software development life cycle to design, develop & deploy both client server & Web Centric business applications using JAVA, HTML,ASP & Network programming. Successful applicants must possess Bachelor's degree in Computer Science & at least 6 mos. exp. Salary commensurate w/exp. Mail resume to: K2S Group, Inc. 304 Park Ave. South, 11th Floor,NY,NY 10010, attn: Mr. Vakil.

Information Systems Administrator wanted by Insurance Agency & Third Party Administrating Co in Fairfax, VA. Must have Bach or equiv in Comp Sci, Mgmt Info Systms & 2 yrs exp. Respond to: John Shaney, Dir. of Op., Worldwide Insurance Services, Inc., 8326 Professional Hill Dr, Fairfax, VA 22031.

Software Engineers (multiple openings) needed for NJ IT Co. Mast Deg w/exp or Bach Deg w/5 yrs exp reqd. Exp must include combo of Java, EJB, Servlets, JSP, C++, C, Oracle, ASP, COM, DCOM, VB, MS-SOL Server, MS-Access, TIBCO, Netscape Applic Server & BEA Web Logic. Send resumes to HRD, Advent Business Solutions, 295 Horizon Dr, Edison, NJ 08817.

Programmer Analyst wanted by New Jersey based S/ware Dev & Comp Consulting Co for job loc in Melbourne, FL. Must have Bach in Production Engg, Comp Eng, related or equiv & 2 yrs exp analyzing, dsgng, dvlpg, testing & implmtg s/ware systems. Respond to: HR Dept, Zeal Consulting Corp, 7700 4th Ave, North Bergen, NJ 07047.

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Programmer Analyst wanted by Co involved in dvlpt & sales of integrated time-share resort prgms in Miami, FL. Must have Bach in Mgmt Info Systms & 2 yrs exp planning, dvlpg, testing & documenting comp prgms for timeshare resort industries. Respond to: F. Valls, Systems Products International, Inc., 2937 S.W. 27th Ave, Ste 101, Miami, FL 33133.

User Support Analyst wanted by New York based Co offering complete services & training for day traders in stock market for job loc in New York, NY. Must have BS in Comp related or equiv & 2 yrs comp exp. Respond to: Andover Brokerage, LLC, Attn: Michael Picozzi III, Chief Executive Officer, 111 Great Neck Road, Great Neck, NY 11021.

Computer Programmer wanted by Co involved in comp s/ware for govt agencies in Arlington, VA for job location in Baltimore, MD.. Must have BS in Software Engg. Respond to: HR Dept, ROH, Inc., 2611 Jefferson Davis Highway, Ste 700, Arlington, VA 22202-4016.

Senior Software Engineer wanted by Co involved in computer consulting & design in e-commerce in Norwalk, CT. Must have Bach in Comp Sci or related subjects & 2 yrs exp researching, dsgng & dvlpg comp s/ware systems. Respond to: HR Dept, Peachisland Engineering, LLC, 247 West Norwalk Rd, Norwalk, CT 06850.

Systems Analyst wanted by Travel Agency in Miami, FL. Must have Bach in Systems Engg & 1 yr exp. Respond to: HR Dept, Sol Way, 169 East Flagler, Ste 1521, Miami, FL 33131.

Software Engineer wanted by Computer Consulting Co in New York, NY. Must have Bach in Comp Sci, Engg or Math & 1 yr exp as software engineer. Respond to: HR Dept, Vitech Systems Group, Inc., 404 Park Ave South, New York, NY 10016.

Advance Systems, Lebanon, NJ seeks Sr. Systems Analyst. Analyze business, scientific, technical problems & user reqmts for applic to electronic data processing systms. Successful candidates should possess min. BS + 5 yrs relevant work exp or equiv; strong skills in C, C++ & SUN Solaris. Please send resume w/salary reqmts to HR Mgr, Advance Systems & Concepts, Inc, 3 Eicke Lane, Lebanon, NJ 08833.

Senior Computer Scientist wanted by Commercial Bank in New York, NY. Must have Masters in Comp Sci & 3 yrs exp defining, dsgng, dvlpg, managing & documenting complex computer projects & project elements. Respond to: HR Dept, HSBC Bank USA, 452 Fifth Ave, New York, NY 10018.

Programmer Analyst wanted by Info Technology Firm in Union, NJ. Must have MS in Comp Sci & 3 yrs exp. Programmer Analyst to engage in Oracle Database development using PL/SQL & PRO*C Development. Experience in pharmaceutical industry a plus. Respond to: HR Dept, Patel Consultants Corp, 1525 Morris Ave, Union, NJ 07083.

Senior Network Administrator needed to design, develop, and maintain large secure web servers and communications functions. Must supervise technical support staff. Must have M.S. in Comp. Sci. + 2 years relevant exp. Reply to: Srini Nemani, Princetec, Inc., 4365 Rte. 1 South, Princeton, NJ 08540.

Systems Analyst – analyze & implement new technologies for company projects using C/C++, SQL, ActiveX, J2EE, & Web Application Servers. Bachelors degree in related field + 3 yrs exp. req. Comp. sal. Send resume to Vested Development: info@vestedev.com, attn: Brian Phelps or fax 781-938-5951.

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Software Engineers (multiple openings) needed for NJ IT Co. Bach Deg w/exp reqd. Exp must include combo of Java, EJB, Servlets, JSP, C++, C, Oracle, ASP, COM, DCOM, VB, MS-SQL Server, MS-Access, TIBCO, Netscape Applic Server & BEA Web Logic. Send resumes to HRD, Advent Business Solutions, 295 Horizon Dr, Edison, NJ 08817.

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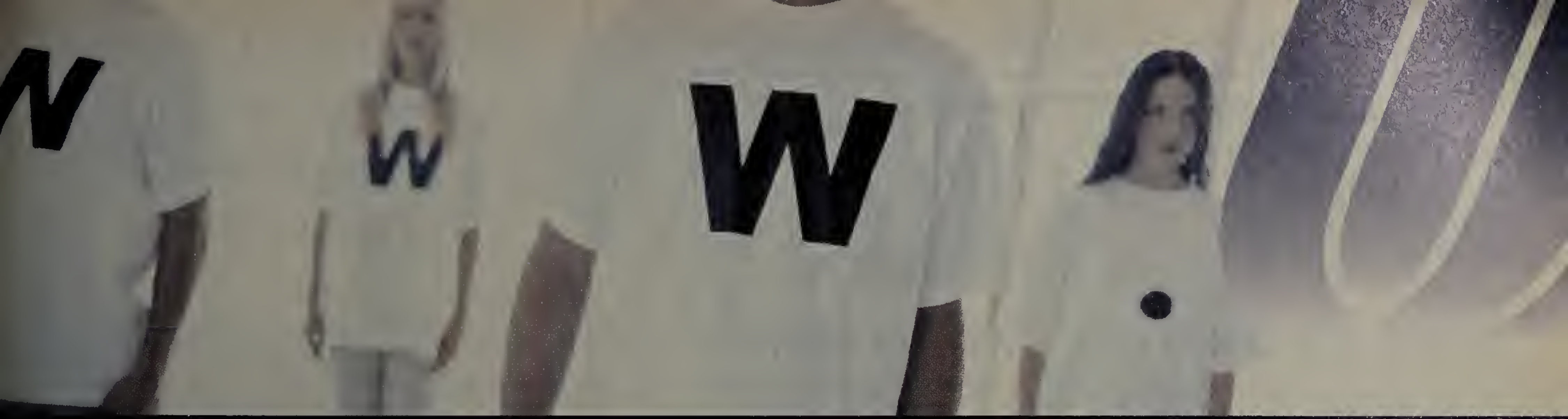

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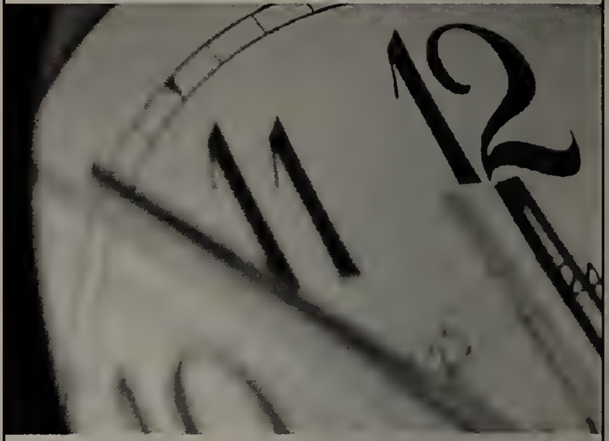

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IT Careers in Washington, DC

Stretched around the Beltway of Washington, DC is an information technology corridor. While it offers some of the best challenges in the new e-conomy, it also provides IT professionals with access to Washington, Baltimore, Annapolis and the culture-rich rural hills of northern Virginia.

The career challenges are many, from the basics of creating the IT infrastructure that runs the country to the latest in web-enabled developments.

Advanced Technology Systems, Inc.
McLean, VA

For more than 20 years, Advanced Technology Systems has introduced new technologies and installed them for federal government agencies.

"The technology has changed constantly over the years," says Leon Perry, corporate vice president. "The technology improves and new tools are created. We have seen the government shift away from pure application development to buying commercial off-the-shelf packages and integrating them into their infrastructure. Today, we're working to web-enable applications and make them available to government business partners via the Internet."

ATS is creating new web sites, establishing mechanisms to provide data from old legacy systems to users that may be anywhere in the world. "To accomplish this, we need people to develop web applications, who have expertise with products like Cold Fusion, who have worked with Active Server Pages, HTML, Visual Basic and other web development tools," adds Perry.

Employees constantly upgrade their skills through technical training opportunities, tuition reimbursement and work alongside senior technical people who are considered experts in their fields. During the first six months of employment, successful applicants are assigned to project teams and receive up to 40 hours of training specific to the projects that they have been assigned.

"Our rate of attrition is well below the industry average," says Perry. "We emphasize the role employees have in making decisions that effect the business and the individual. The ATS culture makes this a good place to work, and we strive for everyone to have a balance between their work and personal lives."

The Arbitron Company
Columbia, MD

For five decades, Arbitron has been helping the broadcast industry understand who's watching/listening, when and to what. "We are the media information services company for the broadcast industry," explains Tony Gochal, senior organization effectiveness consultant. We provide the data that helps in constructing the buy/sell of advertising time."

The company is quickly moving from a paper-based method of collecting data and then crunching it to electronically monitoring, listening and viewing habits, downloading data, crunching it and providing it to customers electronically. "The biggest challenge we have is hiring highly skilled people to help us with this expansion," says Gochal. "We're developing new survey instruments, a webcast rating system to examine how people are interacting with streaming media, and handling huge databases."

Arbitron needs people who have worked with databases, data warehousing and data mining. The company also needs highly skilled system architects. "These are big systems with big databases," Gochal says. "We're developing all new tools, such as the portable people meter, a small device similar in appearance to a pager, which helps track your interactions with media. This passive type of measurement is heavily reliant on software."

Gochal looks on resumes for a mix of experiences, knowledge of UNIX, Oracle, C++, object-oriented design and Java, as well as Internet development. "We are a team-oriented organization, where employees are involved in development and interacting with the user community, testing and documentation."

Arbitron uses some simple factors to attract and keep employees. "Your experience at Arbitron is based on results," says Gochal. "It's a friendly place to work, where you'll be adding skills and experiences to your resume, and where people hired for experience and knowledge are rewarded for applying them."

NetEffect Corporation
Reston, VA

In just 24 months, NetEffect has grown to more than 330 employees and nearly 100 clients, providing services in architecture and infrastructure, converged applications, and management/measurement. The company offers engineers the opportunity to cross all three business areas with customers such as ICG Communications, AT&T Solutions, AT&T, MCI/Worldcom and Nextel Communications.

NetEffect works with companies to bring together the varied technologies that support ATM and voice over. In addition to setting up computer telephony, interactive voice and web-enabled call centers, NetEffect assesses needs, designs infrastructures, installs them, and performs capacity planning, modeling and simulation. As a Cisco Professional Services Partner, NetEffect frequently is called upon to participate in Cisco engagements.

"We look for Cisco-certified engineers, voice engineers and people who have experience in project management and analysis," says Lisa Gaulding, recruiting manager. "We are configuring backbone systems for converged technologies. For instance, in our converged applications we're combining computer telephony with interactive voice, PBC and web-enabled call centers." Consulting skills are critical for employees. "We work in a client environment," says Gaulding.

"One of our differentiators is our state-of-the-art NetCenter at our Atlanta headquarters. Our NetCenter boasts of operability and verification labs, demo labs for all lines of business and in-house training courses. Having the opportunity to work with and train on the latest technologies is a great development tool for building your career," Gaulding says.

thinkXML, Inc.
Rockville, MD

Founded in 1995, thinkXML has made the transformation from an IT software development and consulting firm to an XML software products company.

"We provide XML software products that enable XML business-to-business systems to communicate with the entire marketplace. Our products connect diverse front-end browsers and IP devices with diverse back-end enterprise systems," explains Kimberly Dillard, thinkXML's marketing manager.

In July the company rolled out its new product, thinkXML2000®, version 1.5. "We use open standards and incorporate leading-edge technologies into all of our products," Dillard explains. "We're changing the way companies do business online and the way online business transactions occur."

With the launch of its new products, recruitment has become a major initiative within the company. "We are hiring VB, Java and XML developers, sales, business development and marketing people," says Naomi Pollard, director of administration and human resources. The company currently has 45 employees and plans to hire an additional 50 people this year. "We offer all the standard benefits, stock options, and cutting-edge technologies," adds Pollard. "The basics are a given, but you also get a great culture. We've made a huge commitment to education by hiring top master trainers and creating a collaborative learning environment. Seminars are held once a month to teach emerging technologies."

Pollard says thinkXML also offers a sabbatical program. "If you've been with the company for three years, you get 30 days off, paid with full benefits. It demonstrates the company's interest in your interests. We believe smart people have many endeavors so we want them to go out, learn something new, experience something different, and bring the knowledge back," she explains. At five years, employees get a 90-day sabbatical, and at seven years a 180 day sabbatical.

For more job opportunities in Washington, DC
turn to the pages of IT Careers.

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IT Careers in Portland

It's one of the corners of the country where people believe they can have it all. High tech companies line the roadways, offering a range of opportunities to IT professionals. There's the outdoors, skiing, the beach - all nearby. The ballet, the symphony and the arts scene put the finishing strokes on this perfect painting. It's Portland, where companies tout the lifestyle as much as the professional opportunity. The city itself is a model for urban development, where green space is preserved and boundaries are placed on how and where the community will grow.

Nike, Inc.
Beaverton, OR

Best known for its ads, athletic footwear and apparel, Nike boasts of more than its contract with Tiger Woods. Nike, with its distribution of products and affiliations with contract manufacturers around the world, has an extensive information technology architecture that serves as the enabler of its business operations.

"Nike is in the midst of a multi-year project to shift from legacy systems to application systems, particularly in the Nike supply chain (NSC) group," explains Ed Flaherty, NSC IT recruiter. "We go live with our first country, Canada, in November."

The NSC group, which at one time was decentralized around various business units, is a business entity itself, demonstrating the important role the supply chain will play in the future. Nike is moving more than $800 million in product every month, relying on its supply chain to meet customer product delivery deadlines and increasing demand. In addition, the company has established Nike.com, providing yet another IT venue for those looking for a challenge.

"We're looking for people who have experience in large projects, particularly with implementation of SAP, Siebel and i2," says Flaherty. "We're working to implement an array of application modules while making sure that everything is talking together and need people with technical skill, energy and ideas. The beauty is that our new architecture is a living, breathing entity - we'll continue to move forward, keeping it current and apace with the technology available."

Flaherty says he'll hire about 50 more IT professionals by year-end, a marked contrast to past years when Nike relied heavily on contract IT professionals. "We've changed our philosophy and want full-time people. Over the long term, the supply chain is a critical component to how our business operates. We can't afford the brain drain that occurs when a contractor leaves."

To assure that employees remain with Nike, the company has its Coaching for Excellence program. "Twice a year, every employee sits with the person he or she reports to discuss where you are, what you want to do and what you want to learn. We then help you get there," he says. "Employees take part in workshops and seminars, certification workshops and courses."

"We don't talk about an individual profile for Nike or about whether people 'fit'. We want people who can contribute, who are energetic and bright and who want to participate in a team environment," adds Flaherty. "We strive for excellence, provide a one-of-a-kind campus environment, and provide the tools you'll need to challenge yourself, support your work and be successful."

Tektronix, Inc.
Portland, OR

While the Internet, connectivity and the fastest growing technologies in the planet converge, Tektronix is providing the test and measurement tools that monitor and access every electronic signal and its path.

"We provide the measurement and monitoring tools for high speed data and electrical/optical signals," explains Janet Britton, Tektronix vice president of human resources. Among the company's most well known products is the oscilloscope, which verifies electronic signal integrity.

"As with most companies, our biggest challenge is attracting top talent," adds Britton. "We are growing and offer exciting projects to work on. We've been very successful in growing the past 12 months and must sustain those growth expectations. A key part to doing so is attracting and keeping top employees."

Patty Nelson, manager of university relations, points out that many of the tools developed by Tektronix are software-based. "Our boxes look like hardware, but inside is the very sophisticated software that leverages our ability to help customers monitor and maintain their service."

Tektronix currently has 4,200 employees in 26 different countries. "In 2000 we need to hire about 500 more people," says Britton. "The majority of IT work is done here in Portland, but we also have software engineers in India, Germany and Italy. You'll continue to learn, gaining new skills and knowledge through what you do on the job, through job rotation, global assignments and an opportunity to grow in the IT field or into management."

In addition, Tektronix offers telecommuting and flex hours. "You'll have the chance to work on cutting-edge kinds of work with world-renowned experts - the people who hold the patents on developing these technologies. We encourage this continued discovery.

"People come and stay with Tektronix," adds Nelson. "In the scheme of things, you will be a significant player. The work sells itself, as does the area and the environment. We're big enough to offer advantages, but small enough that you will be a needed part of the business."

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For more job opportunities in Portland, turn to the pages of IT Careers.
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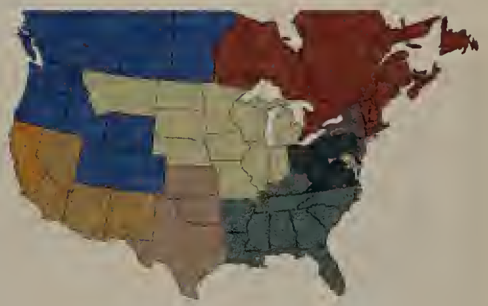

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AT&T's FAT-PIPE PLAN

AT&T has already upgraded 70% of that cable plant to support slower-speed two-way data communications, Schryer says. By year-end, AT&T hopes to have 75% of its cable networks upgraded to handle two-way data and voice.

Bringing the other 25% up to snuff could take another two years, says Greg Braden, executive vice president of telephony operations for AT&T Broadband.

Upgrading a network, though, is different from rolling out services. While the infrastructure is ready in many locations, services are lagging because rollouts require installing provisioning gear, launching marketing campaigns and addressing other peripheral issues.

There's much at stake

The grand scheme is not without risk. Wall Street is getting increasingly antsy about the high-cost cable gamble, which is pummeling the company's stock. AT&T said last week that in 10 of 19 cities where it is already offering local voice it is giving the service away to try to win customers.

The greater risk, however, is standing by idly, waiting for local exchange carriers (LEC) to wade into long-distance and start pitching end-to-end services.

Experience shows long-haulers are vulnerable to that LEC sales pitch. Speaking at the recent Vortex conference, William Esrey, chairman and CEO of Sprint, noted that when Southern New England Telephone (now owned by SBC Communications) started selling long-distance in Connecticut and Rhode Island, it captured 35% of the market. "If SBC and Bell Atlantic enter long-distance and walk away with a 35% share, they will have more than MCI WorldCom and Sprint combined," Esrey said.

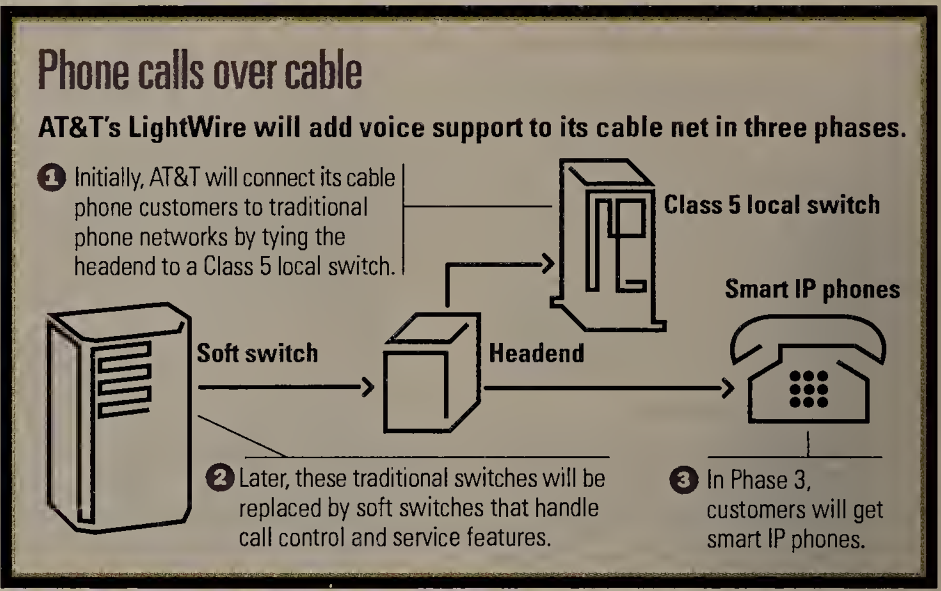
With the long-distance market worth roughly $100 billion and local markets another $100 billion, each percentage point shift represents an enormous stake.

Another reason AT&T is so frantic to rush new broadband services to market is that consumer research by AT&T Labs shows broadband access is the stickiest telecom service ever offered.

"You are more likely to die than change broadband access," Schryer says.

The implication for AT&T is ominous. If LECs can sneak DSL into homes before AT&T gets its cable act together, it will be hard for AT&T to unseat the incumbent service and realize its cable dreams, to say nothing of holding onto its traditional long-distance business.

Owning the broadband pipe that leads into the home is critical because once the infrastructure is in place, the real money is in selling enhanced services. Schryer says AT&T hopes someday to squeeze $150 to $200 per month out of each home with combined broadband data access, telephony and entertainment services.



Phone calls over cable

AT&T's LightWire will add voice support to its cable net in three phases.

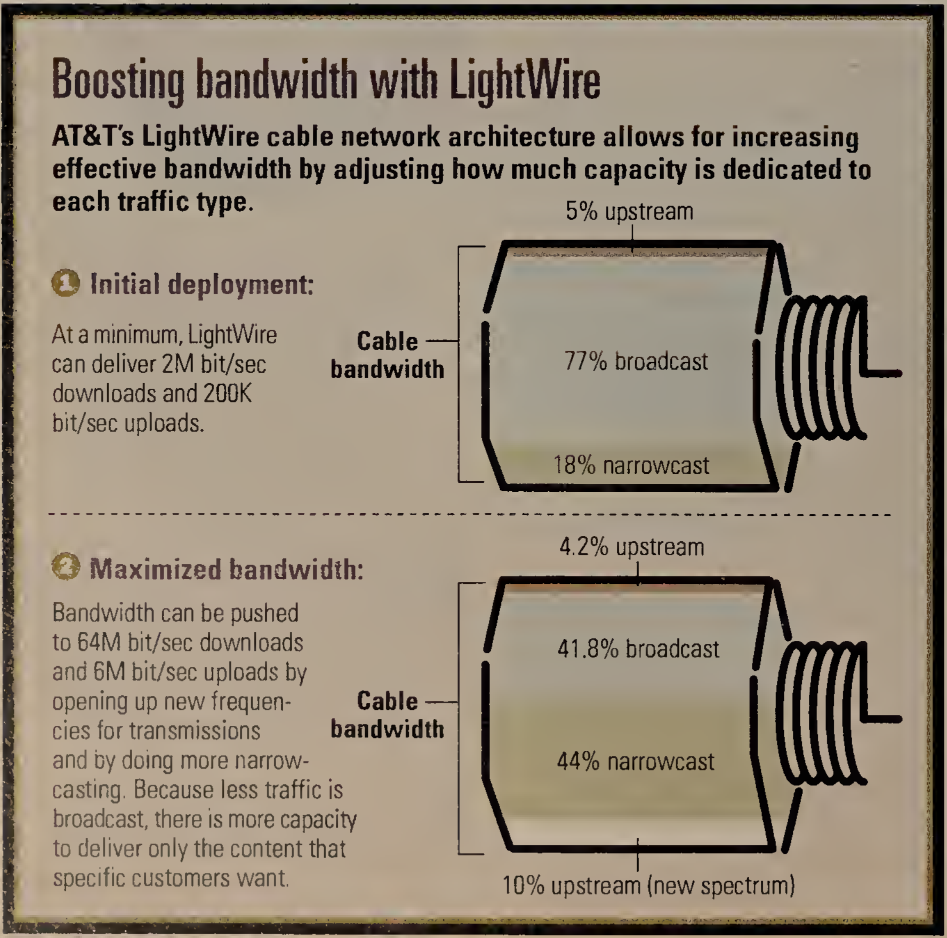
❶ Initially, AT&T will connect its cable phone customers to traditional phone networks by tying the headend to a Class 5 local switch.
Class 5 local switch
Smart IP phones
Soft switch
Headend
❷ Later, these traditional switches will be replaced by soft switches that handle call control and service features.
❸ In Phase 3, customers will get smart IP phones.

Enter LightWire

Although some of the cable systems AT&T has acquired are modern enough to support such mixed-media services, future high-end offerings will be supported by AT&T's LightWire metropolitan-area network architecture.

Networks built to LightWire specifications are less expensive to run than traditional hybrid fiber coaxial (HFC) networks, flexible enough to scale gradually with demand and rich enough in fiber to satisfy even the most insatiable bandwidth hunger.

LightWire supports a minimum of 2M bit/sec downloads and 200K bit/sec uploads, fast enough to rival most DSL services. By comparison, HFC networks deliver 10M bit/sec per coaxial loop, but the bandwidth is shared by as many as 500 customers, meaning actual throughput is considerably lower.



Boosting bandwidth with LightWire

AT&T's LightWire cable network architecture allows for increasing effective bandwidth by adjusting how much capacity is dedicated to each traffic type.

❶ Initial deployment:
At a minimum, LightWire can deliver 2M bit/sec downloads and 200K bit/sec uploads.
Cable bandwidth
5% upstream
77% broadcast
18% narrowcast
❷ Maximized bandwidth:
Bandwidth can be pushed to 64M bit/sec downloads and 6M bit/sec uploads by opening up new frequencies for transmissions and by doing more narrowcasting. Because less traffic is broadcast, there is more capacity to deliver only the content that specific customers want.
Cable bandwidth
4.2% upstream
41.8% broadcast
44% narrowcast
10% upstream (new spectrum)

The main difference between LightWire and HFC networks is that fiber is pushed deeper into the network — closer to customers — by installing fiber multiplexers called MuxNodes and, even further downstream, mini-fiber nodes.

Traffic is pushed to the MuxNodes over wave division multiplexed links, and from there it can be broadcast to all mini-fiber nodes or narrowcast only to nodes that need it.

The architecture offers a number of benefits. There are more opportunities for narrowcasting, which conserves network bandwidth. It limits the length of coaxial cable run to the home to less than about a half-mile, eliminating the need for repeaters on the coaxial lines. That saves AT&T equipment costs and makes the network more reliable because there are fewer electronic components that might fail.

> **"If SBC and Bell Atlantic enter long-distance and walk away with a 35% share, they will have more than MCI WorldCom and Sprint combined."**
>
> William Esrey, chairman and CEO, Sprint

It also means the coaxial cable runs support to as few as 50 homes, says Vice President of Telephony Operations Braden, so there is more coaxial bandwidth to share.

Perhaps most important, LightWire lets AT&T increase network capacity incrementally, according to Sheryl Woodward, a broadband access researcher at AT&T Labs. This can be accomplished in several ways:

- As demand for targeted services grows, the company can increase the portion of cable spectrum used to support narrowcast traffic by displacing broadcast channels. This can quadruple the capacity of the network over time.
- Taking the narrowcasting one step further, minicasting will let AT&T target traffic to still smaller groups, increasing the useful capacity of the coaxial plant by a factor of eight.
- And upstream, AT&T can open currently unused radio frequencies between 900 and 1,000 MHz, boosting capacity 10 times in that direction.

These options together allow for a smooth evolution from LightWire's minimum 2M bit/sec downstream, 200K bit/sec upstream capacity to its full potential of 64M bit/sec downstream and 6M bit/sec upstream, Woodward says.

Because the improvements can be phased in gradually, AT&T can increase capacity when needed instead of having to overbuild and wait for demand to materialize, Woodward says.

But the basic LightWire architecture still involves extra fiber and more fiber nodes, which aren't cheap. As a result,

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> **"I think it's far too soon to say whether we're going to see 64M bit/sec delivered reliably to each home. I think by the time they're done, it's probably going to be more like 10M bit/sec to 15M bit/sec."**
>
> Lisa Pierce, analyst, Giga Information Group

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continued from page 78

AT&T is only installing LightWire in new installations, such as subdivisions and in networks where wiring is strung from poles, making it easier to install fiber and equipment.

AT&T has no specific services yet in mind for full-blown 64M bit/sec LightWire installations.

Schryer says that much bandwidth will make possible things that have never been dreamed of. Customers in Florida, Utah and Texas are already sending traffic over LightWire infrastructure on a trial basis. The company recently deployed LightWire in Texas to support cable television and data traffic.

There are detractors among industry observers.

"I think it's far too soon to say whether we're going to see 64M bit/sec delivered reliably to each home," says Lisa Pierce, an analyst with Giga Information Group, a Cambridge, Mass., consulting firm. "I think by the time they're done, it's probably going to be more like 10M bit/sec to 15M bit/sec."

Not if Schryer has his way. He says flatly: "We'll eventually do fiber to the home."

AT&T, of course, doesn't need LightWire to support basic voice over cable and is busy installing the voice gear needed to make that service a reality.

By year-end, the networks passing some 75% of the company's cable homes will be capable of carrying voice. However, the company won't say when those users will be able to buy the service.

Migrating voice services

What AT&T will discuss is the plan for migrating voice services from the circuit-switched domain to a full packet environment.

As a first step, AT&T is dedicating the equivalent of two broadcast TV channels to the job of carrying phone calls. This is enough to support hundreds of simultaneous voice calls, Braden says.

Incoming calls are fielded by traditional Class 5 local telephone switches connected to cable TV headends, then dropped on fiber links leading to customer sites. At multiplexer nodes, optical signals are converted to electrical and sent along the coaxial cable to the customer.

At customer sites, a network interface unit strips the voice traffic and diverts it to the existing inside telephone wiring. Customers use their regular phones.

In Phase 2 of the migration, the Class 5 circuit switches will be replaced with packet-based soft switches, which perform the call-handling functions.

In the final phase, the cable telephony standard known as Data Over Cable Interface Specification is adopted and voice is packetized at the handset and transported accordingly.

Schryer says AT&T's voice bid will be aided by the fact that the company's pricing model is different than LECs' pricing.

"The [regional Bell operating companies] lose money on residential voice service and make it up on business. We can drive prices down — mop the floor with them," and make it up on higher-cost, higher-profit interactive services, he says.

Schryer admits that AT&T is in a horse race with the LECs and DSL providers. But he says the company will install 400,000 telephone sets by year-end, and claims the company is installing on a monthly basis more two-way cable customers than all DSL service providers combined.

Whether AT&T's grand cable strategy will pay off is uncertain.

Giga Information's Pierce says, "They're spending tens of billions of dollars and to make that pay for itself they basically have to say, 'I'm going to have the majority of the high-end users.' Well, gee, that's everybody else's plan out there, too."◪

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AT&T PREPS BROADBAND BUSINESS SERVICE

Although most of AT&T's cable initiatives are targeted at consumers, businesses also will benefit in the long term. Later this month AT&T will roll out a service for small businesses that supports 256K bit/sec upload and 512K bit/sec download speeds, according to Manish Malhotra, director of AT&T Broadband Business Services.

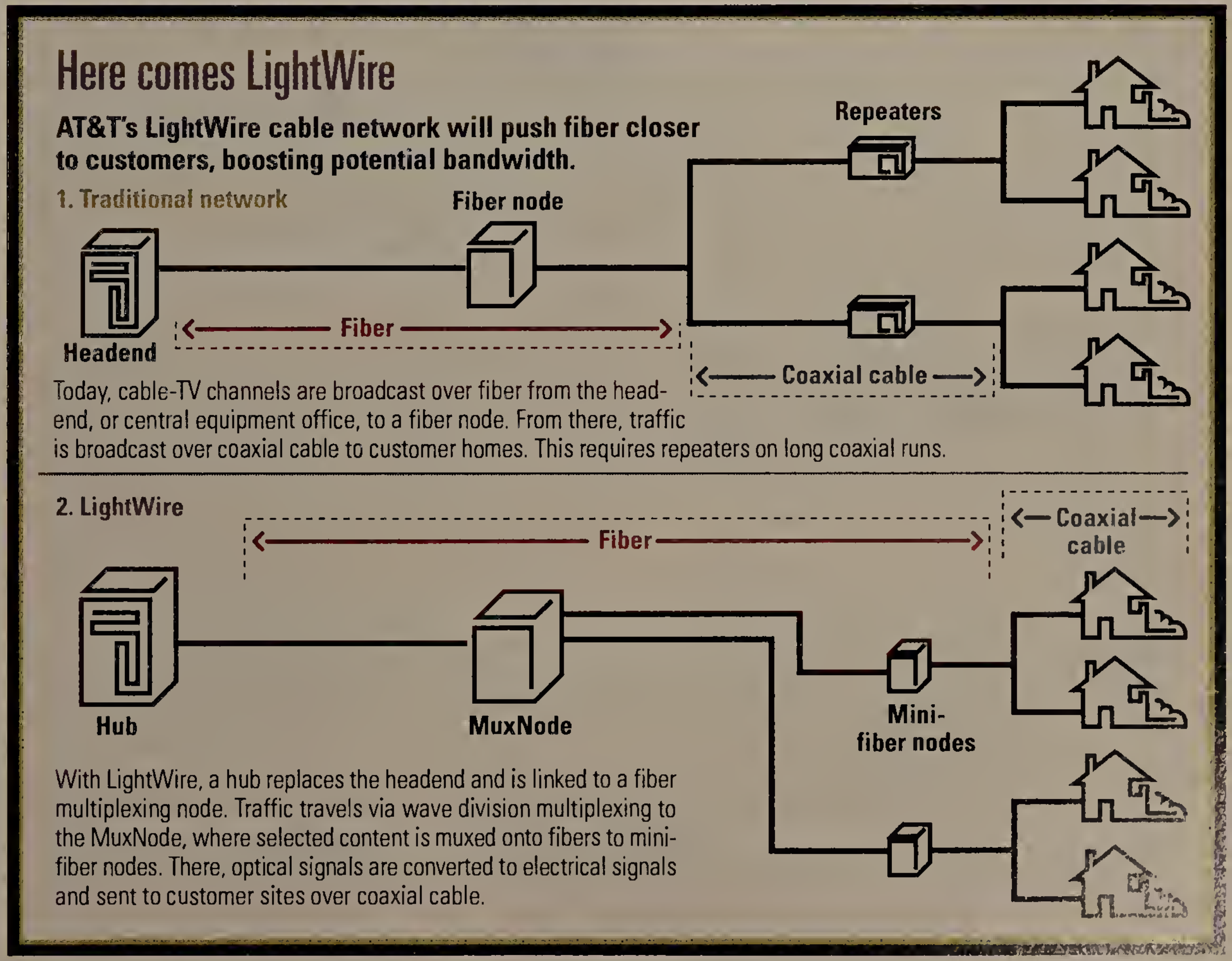
That compares with AT&T's residential Internet cable modem service, which today tops out at about 128K bit/sec.

The offering, which is dubbed Virtual Communication Service (VCS), will let users access corporate data and telephone networks from home (www.nwfusion.com, DocFinder: 9750).

"We're planning to launch business cable offerings as part of our broadband business services, which today includes DSL," Malhotra says.

VCS is dependent on AT&T's two-way service upgrades and will only be available in areas where the service provider has completed those upgrades. Malhotra says VCS will be competitive with AT&T's other broadband offerings, such as DSL.

— Denise Pappalardo



Here comes LightWire

AT&T's LightWire cable network will push fiber closer to customers, boosting potential bandwidth.

1. Traditional network

Today, cable-TV channels are broadcast over fiber from the headend, or central equipment office, to a fiber node. From there, traffic is broadcast over coaxial cable to customer homes. This requires repeaters on long coaxial runs.

2. LightWire

With LightWire, a hub replaces the headend and is linked to a fiber multiplexing node. Traffic travels via wave division multiplexing to the MuxNode, where selected content is muxed onto fibers to mini-fiber nodes. There, optical signals are converted to electrical signals and sent to customer sites over coaxial cable.

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Novell,

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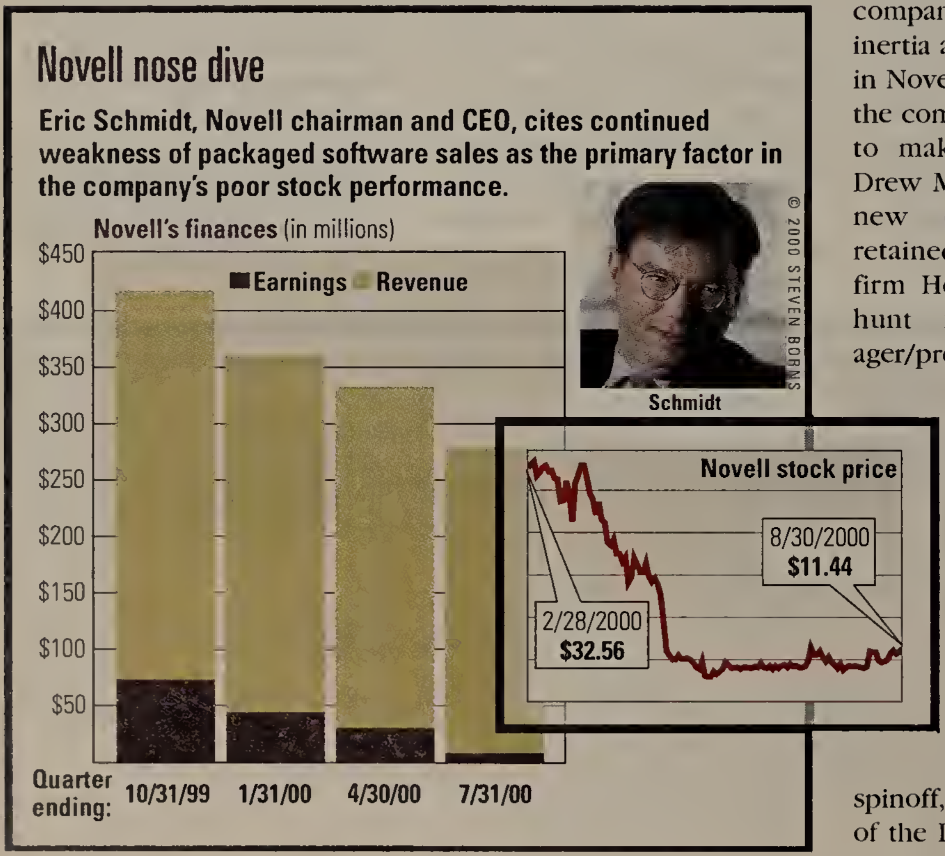
the company headed into a $78 million year-end loss. Industry experts see this upcoming cutback as inevitable and risky.

"You could look at the revenue for the last few quarters and say they need to do something," says Dan Kuznetsky, an analyst with IDC in Framingham, Mass. "Layoffs may cause the stock price to rise because [financial] analysts look at expenses lining up with revenue."

However, Kuznetsky believes that any benefit from such massive cutbacks could be short-lived. "They may result in lower revenue, which will cause a spiral downward."

Novell officials declined to discuss the impending moves in detail, but a spokesperson offered this comment: "We did commit to lowering our operating expenses as part of budget planning for fiscal 2001. How this is going to be done depends completely on the budgeting process."

Institutional shareholders and ex-employees interviewed for this story say Novell's long-running financial woes have been exacerbated by indecisiveness on the part of CEO Eric Schmidt and the board of directors.



Novell nose dive

Eric Schmidt, Novell chairman and CEO, cites continued weakness of packaged software sales as the primary factor in the company's poor stock performance.

Schmidt

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"The company was blind-sided by [its sales troubles]," says Paul Schupf, president of Paul Schupf Associates, an investment firm in Hamilton, N.Y., that is Novell's seventh-largest shareholder. "It all boils down to a sales problem that was not dealt with [early this year]. That problem is surfacing in spades right now."

Novell reorganized at the end of the second quarter into four divisions centered on directory, management, Internet content and customer services.

In an earnings warning issued before disappointing second-quarter results were announced, Schmidt pinned Novell's troubles on a decline in channel sales caused by management and organizational issues. Poor quota management combined with inadequate sales forecasting led to an unexpected $50 million shortfall on projected sales in the last five weeks of the quarter, Chief Financial Officer Dennis Rancy said at the time.

"By the time all that came to surface and Schmidt made [organizational] changes, it was too late," Schupf says.

At the time, two vice presidents responsible for the sales to the channel and equipment manufacturers left Novell. Schmidt said the company's recovery would not occur overnight, but rather would take three quarters to accomplish.

Reducing the workforce not only addresses short-term bottom-line needs, but also better positions the firm to spin out new ventures or sell off pieces of the business, observers say.

Novell has been reported to be in talks with Tivoli about that company acquiring Novell's ZENworks management products.

Of greater potential importance are ongoing — some say stalled — plans to spin out Novell's Net Content division into a separate company. Net Content is responsible for some of Novell's more promising products — including content delivery, hosted services, online storage and caching. Today, the products constitute a fraction of Novell's revenue, but they are considered among the company's most promising in terms of future growth.

Novell's organization today

The company is wrangling over the possibility of spinning off its Net Content division. Here's the present company breakdown:

Net Content:
Caching, content delivery, JustOn storage solutions, DigitalMe.

Net Customer Services:
Consulting, education, support, developer relations.

Net Directory:
Single Sign-on, eDirectory, eGuide, i-Chain, DirXML, Schemax, on-demand services.

Net Management:
NetWare, GroupWise, ZENworks, storage, hosted services.

Plans to spin off the new company have been marked by inertia and indecisiveness within Novell, sources say. Although the company is known to want to make its chief architect, Drew Major, a principal in the new organization, it has retained the executive search firm Heidrick & Struggles to hunt for a general manager/president.

However, sources say in the past month Heidrick & Struggles proposed two qualified candidates for the position, and Novell executives balked and refused the interviews.

Technical issues have also gotten in the way of this possible spinoff, sources say. The kernel of the Internet Caching System (ICS) is based on NetWare, Novell's flagship network operating system, which is notoriously inhospitable to third-party developers.

"The requirement to run ICS on NetWare is difficult because there aren't many tools for writing NetWare Loadable Modules," says Phil Schaecter, an analyst with The Burton Group in Midvale, Utah. NLMs are necessary to efficiently extend the caching environment.

"It's been a historical problem that has kept Novell from successfully establishing NetWare as an application server platform," Schaecter says.

At one point Novell management had asked the software engineering group to present a plan to port the caching kernel and object store of ICS to the more-open Linux platform. That initiative went nowhere.

Funding issues also reportedly hampered plans for the new company. Originally, Novell had hoped to sign up two other companies as equal investors.

Those outside investments fell through because of concerns over the difficulties of developing to the NetWare kernel and concerns that the market opportunity had already been seized by others, sources say.

"There was a magic time and set of ingredients there," says an ex-executive close to the company. "If [the spinoff] had happened six to nine months ago, Novell would have been in a much better leadership position.

"The problem now is that their indecisiveness has led to the market leaving them behind," he adds. "Novell is in a spin and doesn't know what the hell to do to get out of it." ◪

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Common,

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underlies the RealNames service, but the transition will take time because it requires upgrading search engines such as MSN, about.com and AltaVista.

Netword will support CNRP in its Internet keyword service by year-end. The Netword service, which powers URL lookups for Internet telephony provider Net2Phone, runs on a proprietary protocol that will be augmented with CNRP.

Registered Networds cost $30 per year for 1,000 resolved requests per month, with extra requests costing 3 cents each. Volume discounts are available for large numbers of Networds or high-volume requests. End users can create personal Networds for free, the company says.

"CNRP codifies and standardizes the type of service we offer," says Shep Bostin, chief operating officer at Netword. Widespread availability of CNRP will mean "a greater number of users can take advantage of our service."

Two vendors that haven't committed to CNRP are Microsoft and Netscape. Engineers from both companies participated in the IETF's CNRP development effort, but have not announced plans to incorporate the technology into their browsers.

"One of our hopes with our pilot project is for somebody at Microsoft to see our CNRP plug-in and want to integrate it into" an upcoming version of Internet Explorer, Mealling says.

Common names may alleviate some of the legal problems associated with domain names, such as cybersquatting and trademark disputes. While only one person can own a particular domain name and its corresponding URL, several people can register the same common name along with parameters such as location to differentiate the sites. When an end user calls up a common name that is registered to several people, he would receive a dialog box listing the sites in his geographic area or communities of interest. ◪

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MARK GIBBS

In real estate, they say there are three key attributes of a property: location, location, location. But on the Web, apparently you guys don't want to use what should be a great virtual location — the top-level domain ".us" and I can't blame you.

The consequence of being geographically defined is an unacceptably long domain name. For example, I would have to be mgibbs@gibbs.san-buenaventura.ca.us — which is a little unwieldy.

The current registrar for the .us domain is the U.S. Domain Registry administered by the Information Sciences Institute (ISI) at the University of Southern California (www.nic.us/). USC has assigned a zillion third-level registrars for all major locations (New York, Chicago and so on) as well as for many more obscure places (simivalley.ca.us, pflugerville.tx.us and — my favorite — smackover.ar.us).

Just imagine how much of a pain it will be trying to reach someone at one of the latter .... "Sorry, we couldn't get back to ya sooner, we wuz roundin' up cattle in the back 40."

This, of course, raises the curious question of how the various registrars were deemed qualified to control a town- or city-sized subdomain. For example, my city, Ventura, Calif., is under the subdomain san-buenaventura.ca.us, which is controlled by I-Theta Corp. in Manchester, Mo.

And New York (new-york.ny.us), Atlanta (atlanta.ga.us) and Portland (portland.or.us) are controlled by Silicon Prairie Communications in Indianola, Iowa!

'Scuse me? Am I missing something here? How ridiculous is it that these registrars aren't even in the same state let alone the same county as the geographic domains they control? Ridiculous!

Even more interesting is that there is virtually no information on I-Theta! All you will find at www.i-theta.com is a statement proclaiming that it is a "network systems developer." There is no word of its role as a registrar.

Silicon Prairie is a bit more loquacious, but its presence is rather amateurish — a broken hit counter on the home page isn't the sort of presentation that makes you think it pays attention to details.

What astounded me is the scale of what these companies control: Silicon Prairie controls 65 subdomains while little old anonymous I-Theta manages 460!

I can't tell you anything about what it costs to register in the domains controlled by I-Theta because of its almost nonpresence on the 'Net. On the other hand, Silicon Prairie indicates that there is no charge unless you have multiple registrations, in which case it will cost you the princely sum of $10 per additional subdomain, per year.

According to ISI, pricing for registration is under the control of each registry. I tried to find out what it would cost to register gibbs.reno.nv.us but the registrar, Great Basin Internet Services, told me it no longer accepts registrations in any of the 75 subdomains it controls under .nv.us.

According to the Associated Press as reported in Edupage (www.educause.edu/), the U.S. Commerce Department proposes to create a new administrator for .us domain names. The intention is to increase the use of the .us domain and reduce demand in the "crowded dot.com field."

But I would like to see town and city councils getting some control. It would seem logical that if you're going to tie people and online businesses to a geographically defined subdomain, the virtual geography should be managed like the real geography.

Perhaps fees for business registration could be tied to business licenses (get the latter and you get the former, and perhaps a tax credit as an incentive if you actually do e-business), while personal registrations should preferably be free and encouraged — to stimulate the growth of citizenship and community.

This Commerce Department initiative will be interesting to watch. If it does it right, the .us domain will become hot property.

Locate your thoughts at nwcolumn@gibbs.com.

'NET BUZZ

The latest on the Internet industry

PAUL MCNAMARA

The words "back to school" still send a shudder through my shoulders two decades after a merciful college graduation.

So **Buzz** is assuredly not the target audience of these companies and universities that see a wealth of opportunity in providing a wealth of post-graduate classroom knowledge over the Internet.

One such company — **Cenquest** of Portland, Ore. — stopped by last week to demonstrate its e-learning system that is tailored specifically to the needs of technology professionals in search of advanced degrees. The company works through the **University of Texas at Austin** and **the Oregon Graduate Institute of Science and Technology** to provide online credit courses for employees at the likes of AMD, Boeing, Hewlett-Packard, IBM and Intel.

A sample course it showed me looks slick, too, with all the interactive bells and whistles an e-student would expect in this day and age.

Cenquest says a survey it just updated shows a dramatic increase in the acceptance of e-learning among IT professionals, with 97% of those asked saying they would be interested in taking an online course now, as opposed to only 40% two years ago.

The smart money is betting on e-schools becoming all the rage.

"Education over the Internet is going to be so big, it's going to make e-mail look like a rounding error," Cisco CEO John Chambers reportedly uttered in public not long ago.

Maybe it *is* time that I bury those old demons and get to work on a master's degree.

With drkoop.com comatose and the general prognosis for online medical businesses poor, you would think entrepreneurial interest in these schemes might be close to flat-lining.

Well, say hello to **Dr. I-Net Corp.,** a Florida outfit that wants to build a business around the need for people to have ready access to their own medical records.

"Dr. I-Net believes that healthcare emergencies are a direct function of time," says the company's press release. "Frequently, you have to reproduce your entire health history when changing doctors or when faced with a medical emergency. With your records just a click away, Dr. I-Net empowers you to take charge of your health information."

Dr. I-Net's prescription is a free Web-based medical record storage system.

Think about that for a moment: The business depends on people's willingness to fork over their most important private information to an unknown entity that will keep it stored — presumably safe and sound — on the public Internet.

Dr. Buzz does not hold out much hope for this patient.

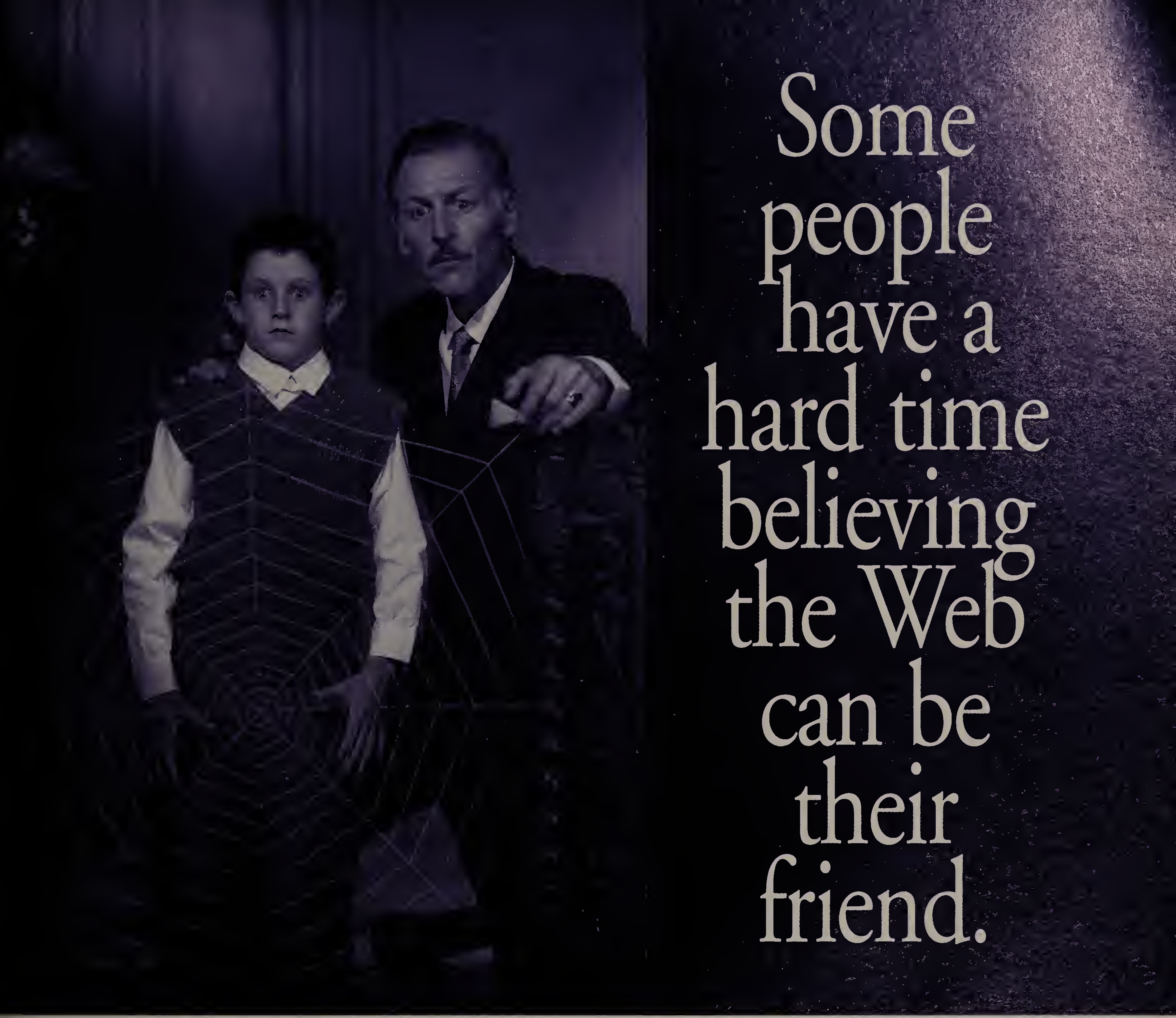
Here's a Web site you might want to check out while praying that the mischief-makers in your organization never find it: http://bogusmail.cjb.net.

The site lets visitors send e-mail with a phony "from" address to anyone of their choosing, which means a prankster can make a message appear as though it was sent by the recipient's boss, spouse or least favorite government agency, just to site a few examples.

Sending anonymous prank e-mail has long been child's play, with a number of online "businesses" — insultpro.com, for example — trying to turn a buck off the devious impulse. But this newest incarnation goes a dangerous step further in terms of the potential for serious damage to people, reputations and perhaps even businesses.

The bogus mail site operator does have the good sense to warn would-be users that he will help the authorities identify anyone who tries to commit a crime using the service. He also offers this bit of sage advice: "Note: Sending everyone in your workplace an e-mail from the boss saying they have Friday off CAN get you in trouble! Don't do it."

Have a comment or a tip? There's nothing bogus about this address: buzz@nww.com.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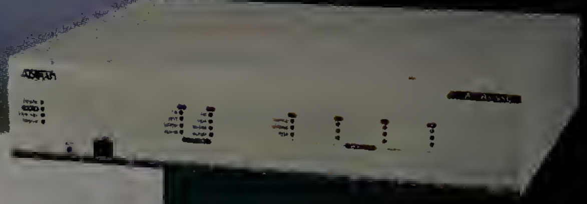

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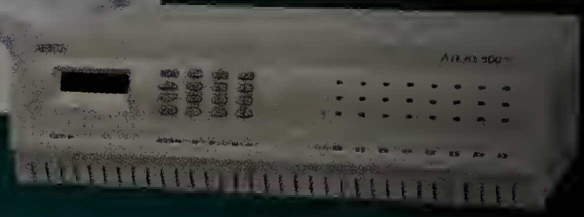

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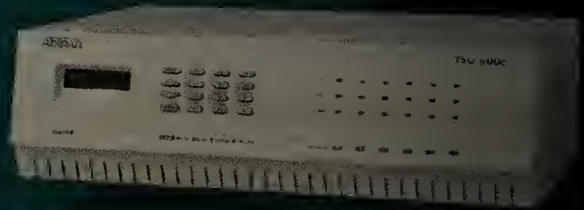

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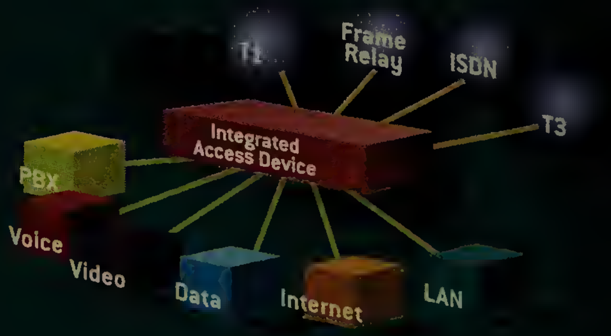

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